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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

The Establishment of Immunity in Some Infectious Fevers. By Sir JOHN BROADBENT, F.R.C.P. 823

Subcutaneous Rupture of the Popliteal Artery. By CECIL P. G. WAKELEY, F.R.C.S., and W. OGILVY REID, F.R.C.S.—(*Illustrated*) 829

The After-effects of Eclampsia with Special Reference to Hypertension and Chronic Nephritis. By JANET BREAKEY, M.D.—(*Illustrated*) 832

Influence of the Sexual Cycle on Breast Lesions. By Prof. HELEN INGLEBY, M.R.C.P.—(*Illustrated*) 835

Sanocrysin in Pulmonary Tuberculosis. By H. E. MANSELL, M.R.C.P. 837

Manipulative Surgery in General Practice. By A. S. BLUNDELL BANKART, F.R.C.S. 840

MEDICAL SOCIETIES

Paddington Medical Society 844

REVIEWS AND NOTICES OF BOOKS

Reflex Activity of the Spinal Cord. By R. S. Creed and others 845

Anatomie élémentaire des centres nerveux et du sympathique. By Prof. P. Gilis. Revised by Prof. J. Euzière 845

Some Factors in the Localisation of Disease in the Body. By Harold Burrows, F.R.C.S. 845

Clinical Atlas of Blood Diseases. By A. Piney, M.R.C.P., and Stanley Wyard, M.R.C.P. 846

An Introduction to Sexual Hygiene. By A. Buschke, M.D., and F. Jacobsohn, M.D. Translated by Eden and Cedar Paul .. 846

New Babes for Old. By Winifred de Kok, M.R.C.S. 846

A Manual of Pharmacology. By Prof. T. Sollmann, M.D. 846

LEADING ARTICLES

PROFESSIONAL SECRECY .. 847

JUVENILE TUBERCULOSIS: A SCOTTISH INVESTIGATION 848

FIFTY MILLION BOTTLES OF MEDICINE 849

ANNOTATIONS

Taxation of Cod-liver Oil 850

Prevention of Hæmorrhage in the New-born 850

Electro-coagulation of the Tonsils 851

Amaurotic Family Idiocy 851

An Index to Progress in Severe Infections 851

Spinal Analgesia: The Causes of Danger 852

Studies in Pink Disease 852

Is Fatal Heart Disease on the Increase? 853

Caravans 853

Early Diagnosis Between Amœbic and Bacillary Dysentery 853

Recognition of Fœtal Deaths 854

SPECIAL ARTICLES

Experimental Investigation of Cancer: Imperial Research Fund's Report.—Vital Staining.—Radiotherapy in Precancerous Conditions. — Selective Action of Radium 860

Medicine and the Law: A Question of Destroyed Case-notes 862

United States of America: Tuberculosis in New York.—Federal Relief Projects.—Research in Causes of Maternal Mortality 863

Budapest: Trachoma in Hungary 864

Ireland: National Health Insurance Commission.—Royal Academy of Medicine in Ireland 864

Memorial to Sir Andrew Balfour.—(*With portrait*) 865

POST-GRADUATE LECTURES

The Surgery of the Sympathetic Nervous System. (Mr. NORMAN LAKE) 855

Purulent Nasal Discharges. (Mr. HERBERT TILLEY) 856

Prostatic Obstruction, with Special Reference to Perurethral Operations. (Mr. E. W. RICHES) 858

Asthma and Desensitisation (Dr. J. L. LIVINGSTONE) 859

PUBLIC HEALTH SERVICES

Increased Tuberculosis Mortality in Young Women.—The Ex-Sanatorium Patient ... 866

Infectious Disease in England and Wales 874

CORRESPONDENCE

The General Practitioner (Dr. E. F. Pratt) 867

House Infection in Blackwater Fever (Dr. A. D. Charters) 867

Marmite in Pernicious Anæmia (Dr. C. C. Ungley) 867

Tannic-acid Therapy (Dr. Gordon Ward) 868

Fuso-spirochætal Disease of the Lungs (Dr. A. S. Hall) 868

Safe Milk (Dr. F. C. S. Bradbury) 868

Respiratory Efficiency Tests (Dr. Alan Moncrieff) .. 869

Thyroideum B.P. 1932 (Armour & Co., Mr. H. W. Paines) 869

PANEL AND CONTRACT PRACTICE

"Failing to Comply."—The Practitioner's Good Name.—Exchange of Views. — Voluntary Contributors in the Post Office.—Brandy as a Medicine 870

OBITUARY

Florence Ada Stoney, M.D.—(*With portrait*).. 871

The Late Prof. Stirling 871

THE SERVICES

Royal Naval Medical Service.—Royal Army Medical Corps.—Indian Medical Service.—Colonial Medical Service 874

MEDICAL NEWS

University of London 872

University of Liverpool .. 872

University of Bristol 872

Medico-Legal Society 872

Home Accidents 840

Remedial Physical Treatment at King's College Hospital 840

Royal Medical Benevolent Fund 854

Hampstead and North-West London Hospital.. 872

South-West London Post-Graduate Association .. 872

West Kent Medico-Chirurgical Society 872

London Association of the Medical Women's Federation 872

British Institute of Radiology 872

Appointments to the Cancer Hospital 872

Child-study Society, London 872

St. Paul's Hospital 872

National Hospital, Queen-square 872

Royal Institute of Public Health 872

Fellowship of Medicine and Post-Graduate Medical Association 872

A Medical Cruise 873

King's College Hospital Dinner 873

Royal Dental Hospital 873

St. Thomas's Hospital Dinner 873

Charles Mickle Fellowship 873

University College, Cork.. 874

NOTES, COMMENTS, AND ABSTRACTS

Diabetes in Scandinavia .. 876

A New Hearing Aid 876

New Preparations: Radiostol Solution and Pellets.—(1) Tab. Soda Rhei Co.; (2) Tab. Cerevisiæ Co... 876

Medical Diary 874

Appointments — Vacancies 875

Births, Marriages, Deaths 875

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ADDRESSES AND ORIGINAL ARTICLES

THE ESTABLISHMENT OF IMMUNITY IN SOME INFECTIOUS FEVERS*

BY SIR JOHN BROADBENT, BART., M.D. OXF., F.R.C.P. LOND.

CONSULTING PHYSICIAN TO ST. MARY'S HOSPITAL, AND PHYSICIAN TO THE LONDON FEVER HOSPITAL

I MUST first of all thank you for the honour you have done me in electing me your President. It is just 41 years since my father held the same distinguished position, and I am proud that something of his mantle should have fallen on me, though I am conscious how unworthy a successor I am.

I have chosen for my address the treatment of infectious fevers, as for over 25 years I have been on the staff of the London Fever Hospital.

Diphtheria

In 1893, when I was house physician at St. Mary's Hospital, it fell to my lot to have to perform 20 out of 46 tracheotomies on young children admitted to the isolation ward for urgent laryngeal diphtheria. Of the 46 cases 31 died, a mortality of over 62 per cent., and no child under 3 recovered. Early in the following year my brother had a severe attack of diphtheria which nearly proved fatal, followed by extensive paralysis which laid him up for over three months. In those days the only treatment for diphtheria was swabbing the throat with some strong antiseptic which had little or no effect in arresting the growth of the bacillus, so that the mortality was high, and complications were very common. I will outline the revolutions in treatment briefly, not discussing them, but dwelling only on the results.

Klebs, in 1875, described the diphtheria bacillus, which he isolated from the membrane on affected throats. It was cultured and identified as the organism responsible for diphtheria by Löffler in 1884. In 1890 Behring discovered that the serum of horses immunised against diphtheria neutralised the diphtheria toxin, and when injected into guinea-pigs conferred protection upon them. In 1894 Roux, working at the Pasteur Institute, demonstrated the value of this specific antitoxin for purposes of treatment in human beings. In September of that year, together with Martin, he published an epoch-making paper in the *Annales de l'Institut Pasteur*, describing the successful results obtain by treatment of 300 children suffering from diphtheria by injecting antitoxin, the mortality being reduced by nearly 50 per cent. From 1895 onwards the use of antitoxin became general, and the following statistical table taken from the report of the Metropolitan Asylums Board for 1929 is an example of the great decrease in mortality from diphtheria which resulted in this country and throughout the world from the employment of antitoxin.

M.A.B. Statistics: Diphtheria Mortality

Year.	Admissions.	Mortality per 100 of patients treated.
1885–1889	821	39·1 } Before use
1890–1894	10,777	29·8 } of antitoxin.
1895–1899	29,058	17·0
1900–1904	31,819	10·8
1927	9,155	4·0
1928	8,981	3·7

It has been found essential that the antitoxin should be given as soon as possible, and if administered within the first 24 hours in sufficient doses there should be little risk of death for the patient. The later the serum is given, the less its efficacy. The following table compiled by Dr. J. D. Rolleston from a series of 1500 cases of diphtheria treated by antitoxin is quoted in his book "The Acute Infectious Diseases."

Antitoxin administered.	Total of cases.	Deaths.	Mortality per 100.
1st day	62	0	0
2nd day	324	10	3·08
3rd day	391	24	6·1
4th day	309	33	10·6
5th day and later	414	49	11·5

In 1913 the skin reaction test indicative of whether or no the subject is immune to diphtheria was discovered by Schick. This consists of injecting intradermally a small measured dose of diphtheria toxin diluted with normal saline. If the subject is not immune a positive reaction occurs within 24 hours which consists of a circumscribed area of redness with some infiltration of the skin. This becomes more intensive in four to five days, leaving a brownish pigmentation as it fades. A negative reaction shows that the patient is not susceptible to diphtheria.

The next question which arose was the immunisation against diphtheria of susceptible subjects. It was realised that passive immunity could be conferred by injection of antitoxin, and this is done sometimes to protect children in hospital exposed to infection from an outbreak of diphtheria in a ward. But the immunity so conferred is transient, and I have known children so protected contract diphtheria from another source within six weeks of their discharge from hospital. Active and prolonged immunity can only be conferred by injection of the diphtheria toxin in suitable doses at stated intervals. The administration of the unaltered toxin was found to be dangerous. In 1913 Behring suggested the use of toxin-antitoxin as an immunising agent, the toxin being sufficiently neutralised by antitoxin to antagonise its dangerous properties. The use of toxin-antitoxin as a prophylactic against diphtheria was first adopted on a large scale in 1921, in New York City, by Park and Zingher, who were the pioneers in this work. Toxin-antitoxin as a prophylactic has now been superseded by some preparation of "toxoid." This consists of the diphtheria toxin so modified by treatment with formaldehyde that it loses its toxic properties, but retains its virtue as a powerful antigen. This method of preparation was first described in 1923 by Ramon working at the Pasteur Institute in Paris who gave the name of "anatoxin" to the toxin so modified. Since then "toxoid" or "anatoxin" in some form has been in general use there and in this country. Three preparations are employed: (1) toxoid antitoxin, T.A.M. "toxoid" with a small amount of antitoxin added; (2) "toxoid" alone, M.T.; (3) toxoid antitoxin floccules, T.A.F. This consists of the washed and resuspended precipitate which forms when "toxoid" and antitoxin are mixed. The advantages of "toxoid" over toxin-antitoxin are four: it is 20 to 30 times more powerful as an antigen; it contains no serum so there is no risk of sensitisation; it is more stable; and it produces little local or general reaction. T.A.F. is considered to be the most efficient preparation, producing the least local reaction.

In considering prophylaxis against diphtheria we may divide the subjects into three groups: the nurses and staff of fever hospitals; the inmates of large institutions and schools where outbreaks of

* The presidential address delivered at the annual general meeting of the Medical Society of London on Oct. 10th.

diphtheria are liable to occur; and the general public. As regards the first group, for some time past it has been customary to apply the Schick to them, and to immunise all the positives as far as is possible. Figures from Dr. J. Graham Forbes's "Diphtheria, its Distribution and Prevention," show that in the London fever hospitals up to 1931 over 8000 nurses and members of the staffs had been Schick-tested, of whom 2000 were Schick-positive and of these, 1530 had been immunised. As an instance of successful immunisation carried out at an individual fever hospital, we may take that of the City Fever Hospital, Colinton, Mains, Edinburgh. From 1922 to 1931 600 nurses and staff were Schick-tested. Of these, 380 were Schick-positive and 366 of this number were fully immunised. The yearly average number of the staff who contracted diphtheria previous to 1922 was 13 to 14. By 1930 this had fallen to four, an incidence of 2·6 per cent. During the three years 1928, 1929, and 1930, 18 of the staff contracted diphtheria. Of these, five had only just completed the immunisation course, six were Schick-positive six months after inoculation. There were only seven nurses during this period who were Schick-negative, and whose immunity was not sufficient to resist repeated and massive doses of infection where diphtheria admissions were very high. These had mild attacks and recovered.

At the London Fever Hospital the toxin and antitoxin floccules are employed for immunisation and a preliminary dose of 0·25 c.cm. is given. If no marked reaction occurs 1 c.cm. is given on the following day and three weeks later a final dose of 1 c.cm. After a month's interval another Schick test is done. If this is still positive a second course of immunisation is carried out. Since 1926, when immunisation was instituted, 213 nurses have been tested. Of these, 96 were Schick-positive, 81 became immune after one course of T.A.F., 15 required two courses. In 1927 five cases of clinical diphtheria occurred, due to an outbreak of diphtheria in a scarlet fever ward, in nurses who had not yet been immunised against diphtheria. There were also three cases of follicular tonsillitis with a positive throat swab. In 1928 one case of clinical diphtheria occurred in a nurse who had finished the immunisation course two months before. In 1929 a remarkable case occurred in a nurse who had been nursing diphtheria for eight years. She had not been actively immunised, but was Schick-negative and the blood antitoxin was 1/5th of a unit per c.cm., whereas 1/30th of a unit is considered sufficient for protection. She was nursing a case of severe laryngeal diphtheria when she developed typical membranes on one tonsil with virulent organisms. She made a good recovery.

Active immunisation of the staffs of fever hospitals in Great Britain, as throughout the world, has been attended with most satisfactory results, and the value of the Schick test as a test of susceptibility has been amply demonstrated.

Coming to the second group, the active immunisation in schools and large residential institutions is not a general practice, and the question is, as a rule, only raised when recurrent outbreaks of diphtheria take place. The preventive measures carried out on an outbreak of diphtheria usually consist of removal of the case affected, isolation of contacts when practicable, and swabbing the throats and noses of all contacts with a view to detecting "carriers."

The diphtheria bacillus may be found in the throat or nose of healthy persons, "carriers," under the following conditions: it may persist in the throat of a patient convalescent from diphtheria; it may be found in the throat or nose of healthy persons in contact with the disease; it may be found in the throat of persons not known to have been in contact with diphtheria. The control of infection by swabbing throats of contacts, involving extensive bacteriological investigations and isolation of carriers is costly and frequently ineffective, as temporary disappearance of the organism from the throat or nose, or careless swabbing may fail to detect the carrier. All who have had to deal with outbreaks of diphtheria in hospital, schools, and large residential institutions will know how difficult it is to stamp out the infection, as case after case will occur at irregular intervals, in spite of all precautions, endless swabbing of throats, and isolation of detected carriers. Prolonged isolation of carriers when detected, moreover, is very costly, and up to the present no treatment except removal of tonsils in throat carriers has been found to be efficacious, and no satisfactory treatment of nasal carriers has yet been evolved. The least costly and the only effective procedure in dealing with such repeated outbreaks is to employ the Schick test on all the inmates, and not merely the contacts, and to actively immunise all those who are found to be Schick-positive. A striking illustration of the remarkable success from such prophylactic measures is the result obtained by Surgeon-Captain S. F. Dudley[1] at the Royal Hospital School, Greenwich. At this school over 100 cases of diphtheria occurred among the boys in 1921. As a result of precautions, search for carriers and their segregation, the number of cases fell to two during 1923–24. So far, so good, but in the years of diphtheria prevalence 1925–6–7 there were 42, 67, and 46 cases respectively. Surgeon-Captain Dudley then decided on general immunisation of all susceptible boys. From February, 1928, onwards all boys were Schick tested, and those who were Schick-positive were immunised. Toxoid and toxoid antitoxin floccules T.A.F. given in two injections at a month's interval were employed at first, and later T.A.F. only given in three injections at a fortnight's interval between each, as this was found to be the most satisfactory antigen. Another Schick test was done after two to six months interval and those who still remained Schick-positive were given another course. As a result of this intensive campaign, only two cases of diphtheria occurred in 1928, both of these in boys who contracted it before immunisation. The only case that has occurred since up to 1931 was in a boy who required five doses of toxoid before he became Schick-negative and, in spite of this, contracted diphtheria six months later.

Our third group was the community. If preventive measures are undertaken to stamp out diphtheria in large towns or districts, it is essential for their success that a large proportion of the most susceptible subjects —namely, children—should be immunised and that immunisation should be undertaken at an early age. Children as a rule are born with a passive immunity against diphtheria which persists for some time. It is a curious experience to see a mother suffering from diphtheria suckling a young baby and to realise that no precautions need be taken for the infant's safety. Investigations to determine when the immunity ceases suggest that the child becomes susceptible at three months, though in some cases the immunity appears to last rather longer.

America and Canada were far ahead of this country in instituting general prophylactic measures against diphtheria. Preventive measures on a large scale have been carried out in most of the States and large

towns throughout America from 1922–26 onwards. In 1921 Park and Zingher immunised 52,000 school-children in New York, using toxin-antitoxin, and by the end of 1923 out of 180,000 children in the city, half were known to be Schick-negative or to have received injections of toxin-antitoxin. Diphtheria mortality and case-incidence steadily declined till 1927, when there was a very severe epidemic of diphtheria and the numbers again rose very considerably. After this disappointing result a diphtheria preventive committee was formed in 1929, and during that year 212,000 immunisations were carried out in New York City, particular attention being paid to the immunisation of young children, and especially of infants 1 year old. As a result of this active campaign in 1930 the mortality had fallen 70 per cent. and the case-incidence 65 per cent. In Philadelphia, with a population of over 2,000,000, by 1929 364,000 children had been immunised, and in 1930 efforts were made to secure immunisation of all susceptible children, and the attack-rate had fallen to the low level of 0·4 per 1000, so that no hospital for diphtheria was required. In Detroit at the end of 1929 153,000 out of 300,000 children were immunised and no case of diphtheria occurred among these, but 1885, or 12·6 per 1000 cases, occurred among the unprotected children. In Chicago, up to 1928, 215,000 children of school and pre-school age had been immunised but, in spite of this, during 1929 the diphtheria mortality and incidence remained high, so in 1930 efforts were made to secure immunisation of 500,000 children during the year. These figures give some idea of the strenuous efforts made to stamp out diphtheria in the large cities in America, and similar steps were taken in other towns throughout the United States.

In Canada diphtheria was for many years one of the chief causes of death in children. Preventive inoculation has been carried out in Ontario since 1920, and throughout the Dominion since 1923–24, and in March, 1929, it was estimated that a total of 500,000 children, or about one-sixth of those under 15, had been immunised. The mortality from diphtheria had fallen from 23·6 per 100,000 in 1921 to 9·4 in 1929, but the attack-rate had not fallen proportionately, though it differed in various provinces. In Ontario, when prophylactic inoculation was general, it fell from 2·0 per 1000 in 1921 to 0·9 per 1000 in 1928, whereas in the province of Quebec, when diphtheria immunisation was not widely practised, it rose from 0·54 per 1000 in 1924 to 1·0 per 1000 in 1929. Energetic measures were then instituted in the latter province in 1929, and immunisation on a wide basis was undertaken and continued in 1930, with satisfactory results. In Hamilton, 120,000 inhabitants, the attack-rate of diphtheria fell from 6·3 per 1000 in 1922 to 0·09 per 1000 in 1927–28, as a result of the immunisation of some 24,000 children between the years 1922–28.

In our own country the first immunisation centre was opened in Holborn in 1922, and during the next four years about 1000 children were Schick-tested and 600 immunised. No further action was taken by other borough councils till 1926, when clinics were opened at Westminster and Camberwell. Since then there has been a gradual and progressive increase in the number of preventive clinics opened in London and throughout the country. In spite of this the total number of Schick-tested in the whole of Great Britain in 1930, according to Dr. Graham Forbes, only amounted to 149,222, the number of inoculated to 129,146, the total number of "protected" (including Schick-negatives) 198,306, a protection-rate of 4·4 per 1000 as compared with 1·2 per 1000 in 1926. In view of these small numbers, it is not surprising that the attack-rate of diphtheria has not fallen in this country.

Most of the statistics quoted have been taken from Graham Forbes's remarkable book on "Diphtheria, its Distribution and Prevention," to which I wish to acknowledge my indebtedness. All the evidence goes to prove that immunisation of the community is a practical proposition. For its success it is essential that preventive inoculation of children should not be delayed till the school age, but that it should be undertaken when they are from 1 to 4 years old, and that a large proportion, two-thirds or more, of the child population should be immunised. Toxoid in some form is an absolutely safe and satisfactory antigen; it should be given in sufficient doses at stated intervals, and a Schick test should be done some two to four months after inoculation to detect those who have not been satisfactorily immunised. The experience of America, Canada, France, and other countries is that preventive inoculation greatly diminishes both the morbidity of and mortality from diphtheria in large towns where the disease is endemic. This country lags far behind the rest of the world in the adoption of preventive measures against diphtheria, in spite of the effort of local health authorities, and it is time that a widespread campaign against this disease should be inaugurated. For its successful issue, as pointed out in a stimulating and instructive leading article in THE LANCET (May 14th, 1932), "there must be effective propaganda and coördinated effort, in order that the public may realise that at the cost of, at most, trifling discomfort to its children, the nation may rid itself of diphtheria with all the suffering, mortality, and expense which the endemicity of this disease entails."

Scarlet Fever

Many years elapsed after the identification of the diphtheria bacillus before anything definite was discovered as to the organism responsible for scarlet fever. The history of the steps of this discovery makes a fascinating story. Klein in 1887 suggested that streptococci were the ætiological factors in scarlet fever, but this view was discredited, and no further addition to our knowledge was made till George and Gladys Dick took up the investigation of the disease, and conclusively demonstrated that hæmolytic streptococci were the cause of scarlet fever. Their first efforts in 1921 were not successful. They inoculated the throats of 30 volunteers with cultures of strains of hæmolytic streptococci from the throats of patients suffering from scarlet fever. The only result was to produce a "sore-throat," and in no instance was there a rash or any characteristic evidence of scarlet fever. Their conclusions were: "The 30 streptococcus throat inoculation experiments constitute a series large enough to discourage further experiments of the same kind with hæmolytic streptococci."

In spite of this they were not downhearted but continued their researches, and in 1923 they had their first success. They took some pus from a whitlow on the finger of a nurse suffering from scarlet fever, and from cultures grown on sheep's blood and agar plates they isolated hæmolytic streptococci. They swabbed the throats of five volunteers with the streptococci they had grown. One developed typical scarlet fever, two sore-throats only, and three were negative. In a second experiment they repeated the process, using the filtrate instead of the culture with negative results on five volunteers. They again

used an unfiltered culture for their experiment, and of four volunteers one developed scarlet fever and two sore-throats. They then came to the conclusion that scarlet fever was caused by a hæmolytic streptococcus or some unrecognised organism closely associated with it in cultures. Early in 1924 they demonstrated that the filtrate of the culture of hæmolytic streptococci which produced experimental scarlet fever gave a positive reaction when injected intradermally in a large percentage of persons who had not had scarlet fever, but no result in patients convalescent from scarlet fever. The positive reaction consists of a small circumscribed erythematous area which appears in four to six hours after the intradermal injection of 0·1 c.cm. scarlatinal toxin, diluted to 1 in 1000. This reaches its maximum in 18 to 36 hours and then fades, leaving some pigmentation or desquamation. This was the origin of the "Dick test." Experimenting further, the Dicks found that injection of serum from patients convalescent from scarlet fever into a Dick-positive subject neutralised the toxin and caused a Dick-negative reaction in a subsequent test. This suggested to them that the toxin might be utilised to produce active immunity, and they proceeded to inject a Dick-positive subject with doses of the toxin. Too large a dose was employed at first, which produced severe local and general reaction, vomiting, pyrexia, and a slight scarlet rash; subsequently the patient became Dick-negative. When used in suitable dilution in repeated doses the reaction was slight, and the patient became Dick-negative.

A. R. Dochez and L. Sherman [2] in the same year confirmed the results of the Dicks, and tried unsuccessfully to produce scarlet fever in various animals. Further, they immunised a horse by a series of injections of the scarlet fever toxin extending over six months. They obtained from the horse a serum which blanched a scarlet fever rash when injected intradermally, and, when injected subcutaneously in sufficient doses into a patient suffering from scarlet fever, caused a rapid fall of temperature and disappearance of the rash, the Dick-positive reaction becoming negative. In 1918 it had been shown that blanching of the scarlet fever rash took place locally when serum from a convalescent scarlet fever patient was injected intradermally. In the light of these discoveries it seemed that the Dick test was exactly analogous to the Schick test in diphtheria, and that it would be a simple matter to produce active immunity to scarlet fever by injection of suitable doses of the toxin at stated intervals, and to neutralise the ill-effects of the toxin in a patient suffering from scarlet fever by antitoxin, as in diphtheria. To a certain extent these hopes have been fulfilled, but the conditions are different. It is impossible to standardise the scarlatinal toxin or antitoxin, since no suitable animal for experimental purposes has yet been discovered except man, and he does not readily offer himself as a subject except perhaps in America to oblige the Dicks.

Prof. C. C. Okell,[3] in the Milroy lectures of the Royal College of Physicians of London for 1932, on the rôle of hæmolytic streptococci in infective disease, raises the question as to the specificity of the scarlet fever organism. He points out that there are two main views held as to the relationship of streptococci to disease. "The first, that each well-defined clinical entity is associated with a special kind of streptococcus, the 'specificity' view expressed in the use of such names as *S. scarlatinæ*, *S. erysipelatis*, &c. The second view is that different diseases due to the hæmolytic streptococcus are due essentially to one species. According to this view, factors of varying virulence and toxicity on one side and varying susceptibility on the other are held to account for the different streptococcal diseases outwardly so unlike." This he terms the "unitarian" view, and in his interesting and suggestive lectures he supports it. He ascribes to the hæmolytic streptococcal exotoxin these important offensive weapons: (1) An erythrogenic or rash-producing toxin, immunologically identical, from whatever source the strain is derived. For this a neutralising serum is available under the name of "scarlatinal antitoxin." (2) A pyogenic property, common to all hæmolytic streptococci to which no antibody has yet been discovered. (3) An invasive property or power to pass the local defences and infect the blood. These three elements, in the attack of the hæmolytic streptococcus, he states, vary in intensity, as does also the strength of the host's defence. Hence the great variation in the clinical and pathological manifestations when man is subjected to the attack of the hæmolytic streptococcus. In further support of his "unitarian" theory, Okell refers to epidemics in which scarlet fever or simple sore-throats are propagated indifferently, and suggests that in these instances the streptococcus, at first non-scarlatinal, has exalted its toxigenicity by passage from individual to individual till it arrives at a phase when it can produce scarlet fever in a Dick-positive individual.

Dr. Alison Glover and Dr. F. Griffith, writing on "Acute Tonsillitis and some of its Sequels" [4] as a result of investigations on epidemics of sore-throat and scarlet fever in a number of schools, found that cases of tonsillitis without rash occur in scarlet fever epidemics side by side with scarlet fever cases. But their conclusions, which are as follows, do not quite match with those of Prof. Okell: (1) Epidemic tonsillitis is due to a hæmolytic streptococcus. (2) Invasion of the throat by a hæmolytic streptococcus may produce: symptomless infection in a healthy carrier, tonsillitis, fever and pharyngitis, or scarlet fever; and any of the three latter may be followed by otitis media or rheumatism. They also conclude that many serological types of hæmolytic streptococci may cause scarlet fever, but four chief types predominate which are responsible for about 70 per cent. of cases. The remaining 30 per cent. are due to strains of a "heterogeneous type" which cannot be classified. Epidemic tonsillitis, they hold, is due to strains from the "heterogeneous group," which may, however, give rise to scarlet fever in susceptible individuals. Griffith, in 1928, had already published a paper in which he differentiated by agglutination methods four separate types of scarlatinal streptococci comprising 70 per cent. of the whole.

Dr. V. D. Allison and Dr. William Gunn, at the Park Hospital, carried out a series of investigations during 1927–28 on over 200 cases of scarlet fever, with a view to determine, if possible, a serological classification of the hæmolytic streptococci responsible for scarlet fever. They found that four different types could be differentiated by agglutination methods comprising about 54 per cent. of the total, and 46 per cent. were "heterogeneous" strains, which possessed no antigens in common with any of the four differentiated types.

Dr. A. R. Balmain and Dr. A. H. G. Burton,[5] during 1928, carried out a series of investigations on 265 cases of scarlet fever: 79 per cent. showed hæmolytic streptococci in the throat; of these, 46·1 per cent. could be classified under one of Griffith's four

groups by serological methods, the remainder being of the "heterogeneous type." In view of the large percentage of inagglutinable hæmolytic streptococci in the latter group, they concluded that it is not possible accurately to correlate the type of streptococcus with the clinical type of scarlet fever. Since 1926 they have treated 670 cases of scarlet fever with scarlatinal antitoxic serum with beneficial results. The temperature fell to normal in 60 per cent. of cases, and there was a rapid improvement in the general condition and that of the throat. They also found that it reduced the number of complications. They came to the conclusion that the results of routine treatment of scarlet fever by scarlatinal antitoxin were good, though not to be compared with those obtained by the use of antitoxin in diphtheria. In common with all who have to do with fever hospitals, they found that there is a considerable proportion of Dick-positive reactors in convalescent scarlet fever patients, and they consider that the number is greater in those treated with antitoxin.

After these devastating criticisms by bacteriologists of the hæmolytic streptococcus responsible for scarlet fever, it is a relief to turn to the successful results obtained, despite all obstacles, by the Dicks themselves and other clinicians who have profited by the discoveries made. The Dicks stated in 1929 [6] that since 1923, when they discovered the skin test of susceptibility to scarlet fever, they have made tests on 32,400 persons. Of these 20,856 gave negative reactions. 11,584 persons with positive reactions were immunised, and no case of scarlet fever occurred among these, though they resided in institutions where outbreaks of scarlet fever occurred from time to time. They also immunised 1191 nurses and residents in fever hospitals, and none of these contracted scarlet fever. Controls were furnished by 37 cases which occurred in persons who had not been immunised. Drs. Blatt and Dale [7] have described how they dealt successfully with repeated outbreaks of scarlet fever at a hospital by Dick-testing and immunising the susceptible in the St. Vincent Maternity and Infant Hospital, which provides 170 beds for children under five. Cases of scarlet fever occurred at irregular intervals over a considerable period. Case 1 preceded Cases 2 and 3 by 19 days, Cases 2 and 3 preceded Case 4 by 14 days, Case 4 preceded Case 5 by 16 days, so infection could not have occurred by direct contact. Moreover, some of the cases were on different floors, so it appeared most probable that adult "carriers" having access to more than one floor were the means of transmission. Of a total of 271, including mothers, nurses, and children, 61 were found to be Dick-positive; of these 43 were children: 46 of the Dick-positive were immunised by injections of scarlet fever toxin at five days' intervals. Adults with hæmolytic streptococci in the throat wore special masks till the cultures became negative. The measures taken were successful, no further cases occurred, and it was not found necessary to close the hospital as had been proposed.

For satisfactory results in immunisation in Great Britain I would refer to those obtained by Dr. W. T. Benson, medical superintendent of the City Hospital, Edinburgh.[8] This observer, over a period of the five years, 1923–27, immunised the staff of a fever hospital, with the result that the incidence of scarlet fever among the staff fell from 8·59 per cent. in 1924 to 0·67 per cent. in 1927. In the latter year there were only six cases, of which four developed scarlet fever before immunisation. He gave four injections of the toxin prepared by Dr. R. A. O'Brien at the laboratories of Messrs. Burroughs Wellcome in doses of 500, 1000, 5000, and made 20,000 skin tests over a period of four weeks. As a result of his investigations, he came to the conclusion that the Dick test is a reliable index to susceptibility to scarlet fever. This conclusion was supported, not only by his experiences in respect of immunisation, but by the following: 97 cases wrongly suspected of being cases of scarlet fever were admitted to scarlet fever wards and found to be Dick-negative. None of these contracted scarlet fever. Thirty-six cases exposed to infection, which were Dick-positive, contracted scarlet fever.

At the London Fever Hospital during the last four years 178 nurses have been tested. Of these 113 were Dick-negative and 65 Dick-positive. Of the latter 48 were immunised, 17 left before this was done. No case of scarlet fever has occurred among the nurses who were immunised or who were Dick-negative when tested.

In France Dr. Radoyé,[9] during 1926–27, performed 1367 Dick tests on students in military academies, and immunised 725 who were Dick-positive. As a result, no case of scarlet fever occurred for two years, whereas previously no year had elapsed without an outbreak of the disease. Dr. Hèlene Sparrow,[10] in Poland, organised immunisation of children on a large scale in 1925. During the years 1925–27 23,657 children were Dick-tested. The percentage of Dick-positive was 55 to 57, and these were immunised. Dr. C. O. Stallybrass [11] carried out immunisation of Dick-positive subjects in various institutions and orphanages in Liverpool, where outbreaks of scarlet fever kept recurring, with the result that no further cases developed. The above instances, which could be multiplied, demonstrate the successful results which have been obtained by prophylactic inoculation against scarlet fever.

Antitoxin.—As regards the antitoxin, which has been extensively employed both in this country and throughout the world, all those who have made use of it agree that usually it produces a rapid fall of temperature and greatly alleviates the local and constitutional symptoms, but opinion varies as to its efficacy in preventing complications. Drs. Burton and Balmain have had favourable experience of its use. The Dicks, as a result of their observations, find that mastoiditis occurs three times as frequently, and nephritis four times more frequently in controls than in those treated with antitoxin. Dr. Taketo Tsuda has reported that between January, 1929, and March, 1930, he treated every case of scarlet fever with serum (40 c.cm.). As the result of his observations he came to the conclusion that if given in the first 24 hours in sufficient doses it ensures a cure and prevents complications. The later it is given the less its efficacy in regard to prevention of complications; if given later than 72 hours after the onset of the attack it is useless. Drs. Friedemann and Deicher treated a number of cases of children in Berlin with antitoxin. They found that a rapid fall of temperature with amelioration of symptoms and early disappearance of the rash resulted. As regards complications, it only appeared to be of value in preventing suppurative lesions, but no difference was noted in respect of incidence of nephritis and adenitis. My own experience at the London Fever Hospital is that it causes a rapid amelioration of local and constitutional symptoms, that so-called "scarlatinal rheumatism" occurs much less frequently as a complication since the use of antitoxin, but I have been disappointed

to find that it does not prevent the occurrence of middle-ear disease and mastoiditis or adenitis, though their incidence is reduced somewhat.

I think you will agree that the successful results obtained in immunisation against scarlet fever are remarkable in view of the impossibility of standardising the toxin or isolating a specific organism. The hæmolytic streptococci appear to be elusive and protean in character, and are responsible for many evils besides scarlet fever and its various complications, and it does not seem possible to sort them out satisfactorily.

I shall say little about the remaining infectious fevers as no recent discoveries have been made in connexion with them.

Measles

The micro-organism for this disease has not yet been isolated. Serum, however, from individuals convalescent from measles has been used successfully for the temporary immunisation of young children exposed to infection. This is of service in preventing the spread of the disease in hospitals and institutions, and for protecting infants and very young children in the case of whom an attack of measles might prove serious. The serum should be given before the sixth day of incubation to be effective.

Whooping-cough

Drs. Bordet and Gengou, working at the Pasteur Institute, isolated the bacillus of whooping-cough in 1906, which they cultured on a special medium of extract of potato and agar-agar with citrated or defibrinated blood. Various authors have confirmed their findings. Drs. Lawson and Mueller[12] isolated the bacillus in 259 out of 1115 cases examined, including 23 cases in the catarrhal stage. They found that there were two effective ways of obtaining cultures: by insulating Bordet-Gengou plates with pellets of sputum expectorated; and by holding a culture plate in front of a patient during a paroxysm of coughing. They claimed that vaccine treatment instituted early in the incubation period would often protect the patient. This, however, is a difficult matter to prove and has not been confirmed. Drs. Saure and Hambrecht[13] claimed that in a series of 200 cases they isolated the organism in 52 out of 53 cases in the catarrhal stage, and in 70 in the paroxysmal stage, but never in the declining stage. They considered that identification of the bacillus in the catarrhal stage was valuable as a means of early diagnosis for purposes of isolation.

Chicken-pox

Nothing definite is known as to the causative organism of chicken-pox, and the only point of interest which arises is that of the association of herpes zoster with chicken-pox.

In 1917 Le Feuvre wrote a paper[14] on "A plea for the common origin of shingles and chicken-pox." He collected 50 cases in which the two conditions were associated, which he classified under three headings: chicken-pox in one individual contracted from contact with shingles in another; shingles contracted from contact with a case of chicken-pox; shingles and chicken-pox occurring together in one individual. Of the 50 cases 41 came under the first heading, 5 under the second, and 4 under the third. The most common occurrence was the development of chicken-pox in a child following contact with shingles in an adult. The incubation period corresponded with that of chicken-pox. Dr. James Taylor[15] referred to Le Feuvre's paper, and quoted cases in which chicken-pox followed contact with herpes, and in a later paper[16] stated that since he had raised the question, several medical men had sent in accounts of similar cases. Personally, I have come across two cases falling under the third heading, in which a well-marked attack of herpes was followed in two or three days by chicken-pox in the same individual. Of course, the association of the two diseases is the exception rather than the rule, but it is interesting to find so many cases on record.

Conclusion

I have endeavoured to trace the great advance in our knowledge of the problems of immunity in connexion with diphtheria and scarlet fever. As regards the former, the success has been such that it would be possible to eradicate the disease from the country by the prophylactic measures now at our command.

As regards scarlet fever, universal immunisation, in the present state of our knowledge, is not a practical proposition, but such success has already been attained in the protection of those exposed to infection in fever hospitals that it may be feasible in the near future. Scarlet fever, however, is not so widespread as diphtheria, and if only a serum can be produced as efficacious in preventing its disastrous complications, as in the case of diphtheria, the need is not so pressing, though an enormous saving of expense to the taxpayers by the abolition of fever hospitals as well as great benefit to the public might be attained by the elimination of diphtheria and scarlet fever.

One word of warning. If these diseases are abolished as the result of what one may term "artificial" immunisation, this must be maintained indefinitely. At the present time natural immunity is to a great extent conferred on the community by droplet infection or mild doses of virus from "carriers" or patients, so that the "herd" are more or less salted. If all Nature's measures for protecting the community are withdrawn, and infection is introduced into an entirely unprotected community, a colossal epidemic might follow.

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NEW SCHEME TO HELP HOSPITALS.—It is stated that the British Charities Association has given its approval to a new scheme for raising money for hospitals, and has expressed a hope that it will be well supported. Manufacturers are being asked to contribute to a central hospital fund one farthing for every pound sterling of their net sales, and it is suggested that the total sum thus obtained will be sufficient to solve the financial problem of the hospitals. The manufacturers would undertake not to increase the price of their goods, which would, where practicable, be marked with the words "Pledged support," and buyers would be asked to give preference to such goods. It is stated that many firms have promised their support to the scheme. It is proposed that a national hospital committee should supply participators with a distinctive emblem which could be used in advertisements.

SUBCUTANEOUS RUPTURE OF THE POPLITEAL ARTERY

A REPORT OF TWO CASES

By Cecil P. G. Wakeley, F.R.C.S. Eng., F.R.S. Edin.

SURGEON TO KING'S COLLEGE HOSPITAL AND THE BELGRAVE HOSPITAL FOR CHILDREN; CONSULTING SURGEON TO THE HAMMERSMITH AND MAUDSLEY HOSPITALS

AND

W. Ogilvy Reid, B.Sc., M.B., F.R.C.S. Edin.

LATE CASUALTY OFFICER, MILLER GENERAL HOSPITAL

Subcutaneous rupture of the popliteal artery is apparently rare, and no detailed account of the condition seems to be extant in the English language. As far as we can discover four cases only have been recorded since the late war. We feel convinced, however, that the lesion is probably not so rare as the number of recorded cases would lead one to expect. The condition is very serious and any hope of saving the affected limb is entirely dependent upon early diagnosis and treatment. The causes of the injury are varied and numerous, and our purpose of insisting upon the seriousness of the condition can be best served by first describing two typical cases.

TWO CASE RECORDS

Case 1.—A man aged 23, a strong healthy stoker, was playing in a game of football. While so engaged he ran to kick the ball, completely missed it, fell down, and cried out on account of sudden acute pain in his right knee-joint. The knee became very swollen and could not be extended voluntarily. Two hours after the accident the pain in the knee-joint was not so severe but pain in the hip-joint commenced. He was admitted to the Royal Naval Hospital, South Queensferry, on May 19th, 1916, four hours after the accident.

When he was examined on admission the right knee-joint was found to be swollen and the leg cold. The dorsalis pedis artery could not be felt. An X ray examination of the leg did not reveal any fracture. The knee-joint was flexed at an angle of 45 degrees, and any attempt at extension caused him considerable pain. The patient was put to bed, and the right leg supported on a pillow and encased in cotton-wool. The patient passed a very restless night, but next day all pain had disappeared from the limb, except for some intermittent shooting pain in the right hip-joint.

The leg was found to be quite cold and sensation was absent from the foot. The knee was considerably distended and there was some œdema over the tibia. The conclusion that the popliteal artery was lacerated in the region of the knee-joint was arrived at, and it was decided to tie the femoral artery and vein in Hunter's canal, the only treatment which held out any prospect of saving the limb. As the swelling about the knee was relatively very great, exposure of the popliteal artery in the popliteal space was obviously a hopeless procedure.

Under ether anæsthesia the femoral artery and vein were ligatured in Hunter's canal some 20 hours after the injury. When the femoral vessels were exposed, the surrounding tissues were found to be infiltrated with blood and exact differentiation was difficult. The leg was encased with cotton-wool and slung up in a frame. The limb remained cold in spite of the treatment, and no sign of pulsation could be distinguished in the arteries of the leg. Two days later gangrene of the foot commenced and the patient began to complain of acute pain in the leg and toes. Amputation was decided upon and was carried out under open ether anæsthesia. A supracondylar circular amputation was performed. When the popliteal artery was exposed it was found to be ruptured just below the opening in the adductor magnus muscle. There was a large rent in the vein at a lower level. The wound was drained with two large drainage-tubes as the tissues were considerably infiltrated with blood. The amputation stump healed well, and the drainage-tubes were removed on the third day after the operation. The patient was able to leave the hospital three weeks after the operation.

The amputated leg was carefully dissected; the popliteal space was one large hæmatoma and the knee-joint was also full of blood. The posterior ligament of the knee-joint was partly ruptured in its middle third in the regions of the intracondylar notch, but all the other ligaments of the knee, both extra- and intra-articular, were intact. There was no sign of any fracture or disease of the bones or ligaments. The popliteal artery was almost completely ruptured just below the opening in the adductor magnus muscle. There was no sign of disease of the vessel wall and the branches of the artery were all intact. The popliteal vein was ruptured about the middle of the popliteal space and its rupture was complete, the two ends of the vessel being separated, one from the other, by a distance of about half an inch. The tissues in the popliteal space were all infiltrated with blood. A section of the artery was examined microscopically and was reported to be quite normal, there being no sign of disease in the walls of the vessel. A piece of synovial membrane of the knee-joint was also examined microscopically, but it was also found to be quite normal and showed no evidence of disease.

Case 2.—A lad of 15 was cycling along Greenwich-road one day in September, 1927, when the front wheel of his bicycle collided with the edge of a tram-line raised slightly above the level of the road. He was thrown off his bicycle in front of a heavy Foden steam-wagon which he alleged passed over both his legs. This was the patient's story, and he subsequently sued both the L.C.C. tramways and the owners of the wagon for negligence. The case, however, went to the King's Bench Division and was heard before a jury, and it was conclusively agreed that the lad was not run over. The actual mechanism of the injury, however, remained a mystery, despite the investigations of learned counsel, and judgment was given that the unfortunate litigant sustained the lesion as a result of falling from his bicycle, and he consequently lost his case.

When brought into the Miller General Hospital the patient was suffering from some degree of shock. He complained of pain in the region of the left knee, but could move the foot and leg on that side, and apparently experienced no loss of sensation, or numbness, tingling, &c. His left knee was considerably swollen in the region of the joint. There was no bruising and no evidence of the limb having been subjected to any crushing violence. A provisional diagnosis of fracture of the patella with associated traumatic synovitis was made, and the patient was admitted to hospital. A rupture of the popliteal artery was not taken into consideration at this stage, and whether pulsation in the tibial arteries was present or absent was not observed.

On the following day the patient complained of numbness of the foot and toes and tingling in the leg, and it was then noted that pulsation in the tibial arteries was absent. A diagnosis of rupture of the popliteal artery was made by Mr. R. C. B. Ledlie, who decided to operate. The artery was exposed and a large quantity of blood clot was evacuated from the popliteal fossa. No muscle bruising was evident, but the muscles and other soft parts in the region appeared to be infiltrated with blood, the latter having percolated for some distance upwards into the thigh and downwards into the leg. The artery was partially ruptured about half an inch distal to the hiatus in the adductor magnus. The vein was intact; no nerve lesion was detected. The artery was ligatured above and below the rupture, the vein being left unligatured. The wound was then closed and drainage-tubes inserted.

This palliative operation was performed some 30 hours after the accident. The following day, that is, on the third day following the injury, evidence of incipient gangrene began to appear, and amputation was decided upon. This was carried out through the junction of the upper and middle thirds of the femur.

The patient made an uneventful recovery, and was seen about one year later, walking well, with a pylon attachment to the stump.

ÆTIOLOGY

In cases of ruptured popliteal artery associated with gross lesions in the region of the knee—e.g., fractures, dislocations, and those due to a crushing violence, such as occur when the limb is run over—the cause of the rupture is usually obvious. Schultz,[1] in his excellent review of 45 cases, gives an analysis of causes, and in his series there were 11 due to various forms of crushing violence, 11 due to luxation of knee, 5 due to fracture at lower end of femur, and 1 other referred to below. Harrison Cripps [2] records an interesting case in which a man had his leg pushed along in front of a braked wheel, which did not pass over the limb, and remarks that "the mechanism of rupture would appear to be the result of a force acting in an oblique direction, from below upwards, on the lower part of the femur." The artery gave way

just above the origin of the anterior tibial branch. Pozzi,[3] of Paris, has drawn attention to the frequency of rupture of an artery just above the site of origin of one of its large branches, the latter apparently acting as fixing agents, presumably in a manner similar to that of guy ropes.

When cases in which indirect trauma is the cause are considered, the problem becomes increasingly obscure. Such cases can, however, be classified into two groups—those in which the mechanical explanation offered seems adequate or, at any rate, likely, and those in which any explanation offered must of necessity be largely hypothetical.

The chief interest of the two cases we record above is that they fall into the second category. Adams [4] records a typical case which was accompanied by a slight luxation only of the lower end of the femur backwards, easily reduced by gentle manipulation—yet the artery was completely ruptured. In Schulz's series [1] three cases of rupture were due to forcible extension of a partly flexed knee-joint in which all the soft parts were contracted as a result of previous inflammatory changes in the region. A number of cases are also known in which this disaster has occurred in the course of enthusiastic but misguided "mobilising" of stiff arthritic joints. In all cases, of course, an unhealthy arterio-sclerotic condition of the vessel wall will obviously predispose to rupture.

We now come to the more obscure group of cases in which the rupture of the vessel is in itself the paramount lesion, and there is no evidence of other injury in the region. In connexion with these it will be profitable first to consider some points in the anatomy of the popliteal artery (Fig. 1).

Anatomical relations render this artery peculiarly susceptible to injury either by contusing or by twisting and stretching forces. The vessels in the popliteal space are in intimate relation to bone, more particularly when the knee is fully extended or hyper-extended (abnormally) (Fig. 1, A and B). Proximally the popliteal artery and vein are fixed at the adductor hiatus by the adductor magnus tendinous arch. Distally, at the terminal bifurcation of the popliteal artery, these vessels are anchored to some extent by the tendinous arch of the soleus, but chiefly by the tendinous arch of the tibialis posticus muscle, which together with the interosseous membrane through which it passes fixes the commencement of the anterior tibial artery (Fig. 2). The fact that the artery and vein are intimately associated in a common sheath in this region is also important, the two vessels frequently being ruptured together. Thus the anatomical proximity of the popliteal artery to the posterior surface of the femur and its proximal and distal fixations are the latent anatomical factors which tend to explain its subcutaneous vascular rupture, the result of a severe contusing injury without an associated bone lesion.

In cases where there is no evidence of a contusing force in the region, the above factors also play a part. Our cases quoted above fall into this category, and Mr. J. L. Stretton, of Kidderminster, also tells us of a similar case in his practice. A young lad suffered this injury during a game of football, yet he could not recall having been kicked in the region, nor could any sign of bruising be detected. Presumably, here again, a sudden hyper-extension at the knee-joint was a factor of great importance.

As a rule, the suddenness of the applied violence or movement induces a marked tension and distension of the vessel wall. In the popliteal artery the elastic tissue of the vessel wall offers but little protection against injury from sudden violence. The maximum tensibility of the vessel wall may not be reached, but the vessel, owing to its natural anatomical fixation, is ruptured by the abruptness of the violence to which it is subjected. Lipshutz,[5] who has pointed out some of the facts set out above, compares the mechanism of the vascular wound to a similar sequence of circumstances in the case of a taut piece of string. If the latter be firmly fixed at either end, then a sudden pressure or pull applied to its middle will cause it to give way.

An anomalous tendon, which may act as an additional factor in the fixation of the vessels, has been described in the popliteal region. The tendon has its origin from the short head of the biceps muscle and is inserted in a fan-shaped fashion into the postero-medial aspect of the capsule of the knee-joint, thus forming an additional arch over the vessels. As Lipshutz remarks, it must be admitted that this is an uncommon finding, but on the other hand, rupture of the popliteal artery is also relatively rare.

It will be gathered that the mechanism of rupture must be inferred from the known factors which we are enumerating. Two further points are worthy of consideration.

When the leg is extended to the normal degree the popliteal vessels do not rest against the bony surface, and consequently we can understand why they may be ruptured when the knee is over-extended (as in the case of anterior dislocation of the tibia—vide Fig. 1 B). Also in view of the firm fixation of the vessels anatomically, the rotation which takes place in the final locking of the knee-joint may presumably play some part in producing a torsion of the vessel when the joint is over-extended. This combined twisting and stretching of the vessel would together be very conducive to rupture.

DIAGNOSIS

In almost all cases, immediately or shortly after the injury, the patient complains of extreme pain, and a feeling of distension in the region of the knee (as if the leg felt too small). A swelling appears behind the knee, becomes stony hard, and gradually spreads upwards and downwards from the popliteal region. In some cases, according to Meyer,[6] the leg may swell to two or even three times its normal size. This, of course, is manifestly due to blood percolating downwards between the muscle layers.

Within a few hours the patient complains of a sensation of pins-and-needles first in the leg, then in the foot, and finally in the toes. Gradually, a numbed "dead" feeling is experienced in the foot, and localisation of sensation becomes more and more vague. Eventually, there is loss of all sensation as far as the middle of the leg.

In the case of complete rupture of the vessel, loss of pulsation in the anterior and posterior tibial arteries is an early sign. In cases of partial rupture, weak pulsation is usually still felt in the tibial vessels.

Rarely pulsation may be evident in the popliteal hæmatoma, and in the case of partial rupture, a pulsation murmur may be heard at the site of the lesion. This is said to be diagnostic of partial rupture, but these signs are not of much practical value, as they have only been noted on rare occasions. In 34 recorded cases pulsation was observed twice and a murmur was heard in one case only. Wahl [7] describes a remarkable case of rupture of both artery and vein in which a cross-anastomosis was established between the two vessels. The blood from the proximal part of the popliteal artery passed into the distal part of the severed vein with the result that a sort of reversed circulation was maintained for a time. Such an extraordinary occurrence, resulting

from injury to vessels in any part of the body, has only been recorded twice.

From the above account of the very definite signs of rupture of this vessel, one would have thought that diagnosis of the condition should be relatively easy, and it is somewhat surprising to find that in most of the cases recorded, the diagnosis was not definitely established until the onset of gangrene, this usually taking place three or four days after the original injury.

Presumably this is partly due to the fact that the condition is so rare that the possibility of its occurrence does not enter the mind of the practitioner when he first sees the case. Moynihan has referred to the same diagnostic failing in the medical mind in connexion with another rare condition—acute pancreatitis—which, he says, is usually missed "because it has not been thought of." Like rupture of the popliteal artery, once the possibility of the lesion is seriously considered on logical lines the diagnosis is a long way towards being established.

Nevertheless, when one or other of the more salient diagnostic features are lacking, as is sometimes the case, the problem is rendered more difficult. For example, in the case recorded by Meyer [6] the most striking sign of pronounced swelling in the popliteal region was absent.

When the site of lesion was examined after operation only three or four spoonfuls of blood were present in the *Kniekehle*, yet both artery and vein were completely ruptured about 2 cm. distal to the hiatus in the adductor magnus. Both vessels were closed by a thrombus about 2 cm. long. The central end of the artery was very contracted and conical in shape. The injury was thought to be simply a "crushing wound" of the knee region without complications, the coldness and numbness being attributed to pressure on the tibial nerve. Failure of the pulse on the second day was also not regarded as significant and this was also the case in most of the other instances recorded. In a word of counsel Meyer says that in a case of relatively slight injury in the region of the knee where there is numbness and cold feet, always think of rupture of the popliteal artery—but do not forget the possibility of diabetes mellitus.

Billroth [8] describes a case similar to the above, in which the artery was ruptured when the lower end of the femur was fractured by a stone. The skin was insensitive as high as the knee, and the superficial veins were engorged with blood, the diagnosis being established on this latter fact, a point worth recording.

In the case of partial rupture, the diagnosis is often more difficult as pulsation in the more distal vessels is not always absent. The persistence of pulsation and a murmur heard over the fresh hæmatoma may be regarded as diagnostic features of partial rupture.

FIG. 1

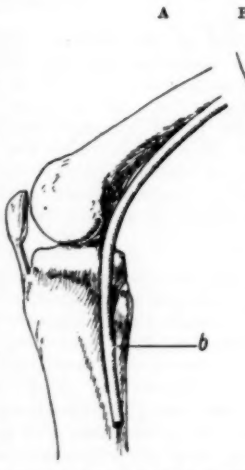

FIG. 2

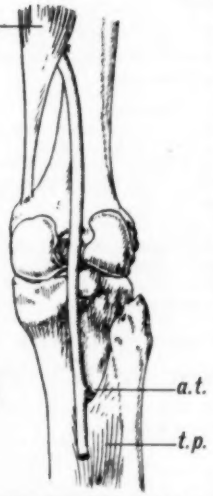

FIG. 1.—The popliteal artery in side view illustrating its relations to the skeleton: A, in slight flexion; B, in hyper-extension (abnormal) of the knee-joint. *b*, terminal bifurcation of the popliteal artery.

FIG. 2.—The popliteal artery from behind, illustrating the structures which are concerned in the fixation of its two extremities. *a.m.*, adductor magnus muscle; *a.t.*, origin of anterior tibial artery; *t.p.*, tibialis posticus muscle.

TREATMENT

In this, as in many other surgical conditions, the prognosis depends largely upon the rapidity with which the diagnosis is established and the proper treatment instituted. It would appear that tying the artery does not prevent the onset of gangrene, and Meyer even goes the length of saying that in the case of total rupture of the popliteal artery, it is impossible to save the damaged leg. Schulz states that "a rapid decision to amputate is in the best interest of the patient."

Apart from the empirical occasions for the above statement, it would appear upon consideration of the mechanism of the condition that they are what one would expect.

After the injury bleeding from the vessel soon ceases as a result of various factors. Considerable shock lowers the systemic blood pressure. The muscle wall of the vessel contracts (especially the circular layer after the rupture of the longitudinal clot) and consequently the vessel tends to close and thus diminishes the bleeding. A clot rapidly forms at the site of the rupture. Furthermore, the effused blood is limited in its spread by the fat and muscles in the region, and therefore the hæmatoma soon attains its maximum size. All these factors tend to bring about such a rapid equalisation of pressure inside and outside the vessel that the hæmorrhage ceases.

Local operative interference therefore, if undertaken, should not be with a view to tying the vessel primarily, but rather in an attempt to improve local conditions with a view to the facilitation of the establishment of an adequate collateral circulation. The latter is prevented in the limb after the injury by the following factors:—

(*a*) Pressure of the blood clot on the collateral vessels which would normally carry the blood when the main vessel was occluded.
(*b*) Damage to the associated soft parts.
(*c*) Damage to the smaller vessels themselves at the same time as the large artery and due to the same cause.

Factor (*a*) is, of course, most potent in hindering the establishment of efficient collateral circulation, and consequently evacuation of the clot by operation is manifestly a step in the right direction. Factors (*b*) and (*c*) however, are also important in this relation, and can be but little improved by operative interference. Factor (*b*) may be considerable. Poland [9] found the internal head of gastrocnemius torn. In many other cases the nerve was also almost torn through.

In view of the above facts, it is evident that once the condition is diagnosed tight bandaging, which

would obviously embarrass the circulation still further, should be avoided.

The experience of some would seem to warrant local operation if diagnosis is made soon after the injury. The clot should be cleared out and the vessel ligatured. In most cases the vein is also damaged, but should this vessel be intact, it is advisable to ligature it as well, as by this means equilibration of the circulation seems to be brought about more rapidly. Albrot,[10] in 11 cases which he records, claims to have avoided gangrene in 5; Klein,[11] in a case of rupture of both artery and vein, avoided gangrene by ligature of both. If diagnosis is made later the best course to adopt seems to be to await the formation of a line of demarcation of gangrene, and then to perform amputation through the middle third of the thigh. The prognosis of partial rupture is, of course, more favourable, but there appears to be no case recorded in which suture in continuity has been successfully carried out.

We wish to thank Miss Mary Barclay-Smith for her illustrations and Mr. Ledlie for allowing us to report Case 2, which was under his care.

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AN INQUIRY INTO THE AFTER-EFFECTS OF ECLAMPSIA

WITH SPECIAL REFERENCE TO HYPERTENSION AND CHRONIC NEPHRITIS

BY JANET BREAKEY, M.D. SHEFF.

ASSISTANT PHYSIOLOGIST, JESSOP HOSPITAL FOR WOMEN, SHEFFIELD

MUCH has lately been written about the after-effects of eclampsia. Most observers have noted the liability to subsequent chronic nephritis, though they differ as to its incidence.

Harris [1] examined 27 women one year after an eclamptic attack and found chronic nephritis in 3. Nevermann [2] found the condition in only 3 out of 60 patients, though 30 others showed various symptoms, such as headache, visual disturbances, hypertension, &c.

Greenhill [3] also traced 60 "post-eclamptics," of whom 2 had died of nephritis, and 3 had this complaint when seen.

Döderlein [4] had only 1 case of hypertension in a series of 26 cases; 3 had slight albuminuria, and 7 albumin and casts.

Sym [5] examined 74 cases and found chronic nephritis in 2; Caldwell and Lyle [6] found nephritis in 8 per cent. of women after eclampsia, while Gibson [7] found the condition in 5 out of 14 patients.

It is difficult to compare results and draw conclusions without having a standard, and it was held desirable to control the results by following-up a number of women who had had eclampsia, and comparing the findings with those in normal parous women of corresponding parity and age.

Method of Inquiry

A review has been made of cases receiving in-patient treatment at the Jessop Hospital for Women, Sheffield, during the years 1908–1928 inclusive. These cases examined have been divided into two groups: (1) eclamptic patients who had definite fits; and (2) normal women as controls.

During the 21 years in question 333 cases of eclampsia were treated, with a mortality of 72 (21·32 per cent.). Of the surviving 261 patients, 10 were unmarried, and no attempt was made to communicate with them. Thus there remained for investigation 251 patients, of whom 94 attended for examination. A further 6 replied but were unable, for various reasons, to attend. Another 15 were not seen, but were traced through the courtesy of their family doctors, who reported on their condition; of these 7 had died. Four further deaths have been traced, making 11 altogether. Thus 132 were untraceable.

The controls were women without toxæmia, but who were as nearly as possible—as regards age, parity, and even method and date of delivery—similar to those of the eclamptic group who had attended for examination. Over 1300 women in this group were written to, and 218 attended. Seven are know to have died.

Method of examination.—Inquiry was made as to the patient's health and further pregnancies since the eclamptic convulsions or normal delivery as the case might be. In all cases both the systolic and diastolic blood pressure readings were taken whilst seated, due precautions being taken to eliminate a rise of blood pressure from emotional causes. The urine was examined, a catheter specimen being taken whenever albumin was found.

Results

Of the 11 eclamptic patients known to have died (at an average age of 34) after discharge from hospital, 1 was transferred to another institution with mania and died nine days later from pneumonia. A second was transferred four weeks after delivery to another hospital, where she died of broncho-pneumonia. Of the remaining 9, 4 died of nephritis, 1 of "dropsy" within four years, and 1 of perforated gastric ulcer. Another died of pneumococcal peritonitis five years later, but, since post-mortem examination revealed small white kidneys, she evidently had chronic nephritis. Two were certified as having died from "heart disease," death occurring respectively one year and seven years after leaving hospital.

Of the controls 7 are known to have died—at the average age of 63; 4 died from conditions in no way referable to renal disease. In the other 3 cases it was impossible to trace the cause of death.

ANALYSIS OF BLOOD PRESSURE READINGS

The average of both the systolic and diastolic blood pressures (at the time of examination) have been calculated for age-groups of five years—i.e., 20–25, 26–30, &c., and are shown in the Figure. Before we compare the results found in the two groups of cases it is necessary to consider the control curves. These show a general upward tendency between the ages of 20 and 60, with a slight, but definite, depression between the ages of 40 and 50. The upward tendency is in agreement with observations which have been made by various observers.

Taylor [8] states that in healthy persons the blood pressure increases from childhood to old age.

Leonard Hill [9] is of the opinion that the normal systolic pressure in healthy young men, measured by the digital method, is 110–130, but he also states [10] that this pressure should be as much as 10 mm. higher as measured by the auditory method, so that pressures up to 140 might presumably be considered normal.

The depression of blood pressure between the ages of 40 and 50 is an observation which one cannot find

recorded and is somewhat difficult to explain. The age at which it appears suggests some relation to the menopause.

The blood pressure curve for the eclamptic group rises much more rapidly after the age of 30, as compared with the control cases; the menopausal drop is exaggerated; there is a rapid rise up to 187 mm. and a slight fall, probably due to elimination, by serious disability or death, of the worst cases, which would have brought up the average still higher.

As there appears to be a difference of opinion as to what is to be regarded as the maximum normal systolic pressure, that indicated by Hill (140) has been accepted. On this basis 42·5 per cent. of eclamptics and 33·72 per cent. of controls have now got hypertension. On the control curve, however, the average systolic pressure rises to a maximum of 150 mm., and if this is taken as a standard, 26·5 per cent. of eclampsia patients and 21·6 per cent. of controls have hypertension. (Table I.)

TABLE I

Blood pressure.	Eclampsia.	Controls.
Over 140 ..	40 = 42·5 per cent. ..	74 = 33·72 per cent.
,, 145 ..	33 = 35·1 ,, ..	63 = 28·8 ,,
,, 150 ..	25 = 26·5 ,, ..	47 = 21·6 ,,

Whichever standard is accepted a higher percentage of eclampsia cases is found to have hypertension.

The question arises as to whether the blood pressure gets progressively higher in relation to the time which has elapsed since the eclamptic convulsions, and in order to answer this, the average systolic blood pressure has been calculated in all the age-groups, in relation to the time since the attack.

All the age-groups show the same characteristics, such as a high reading in the 0–5 years section; a high jump between the second and third sections, and a low level in the "16 and over" group. This last is probably explained by two factors: (1) in the case of the eclamptics by death of the worst case; (2) in both classes by reluctance on the part of patients suffering from severe disability resulting from high blood pressure to come up for examination. (Table II.)

TABLE II.—*Average Systolic Blood Pressure*

Years since pregnancy.	Age-group.							
	31–35.		36–40.		41–45.		46–50.	
	E.	Ct.	E.	Ct.	E.	Ct.	E.	Ct.
0–5 ..	134	122	149	129	140	137	185	—
6–10 ..	135	141	139	142	—	143	138	158
11–15 ..	—	140	156	146	204	152	189	150
16 and over	126	130	166	128	159	144	133	126

E. = eclampsia; Ct. = control.

From Table II. one concludes that there is a fairly definite indication (after an initial drop) of a rise in blood pressure as time elapses after the attack. The fall in pressure between the fifth and the tenth years after the attack seems to suggest temporary recovery.

An attempt was made to determine whether further pregnancies have any effect on subsequent pressure readings. In the case of the controls there is no upward tendency as a result of further pregnancies, including miscarriages. Two groups of the eclamptics show a slight tendency to increase, but in two other groups the observations are indefinite. The early death of the worst cases makes these figures show to advantage, and there is thus a slight indication of rise of pressure with further pregnancies.

Inquiry was made into the relation between the number of fits and the pressure records, but the results were indecisive.

EVIDENCE OF RENAL DAMAGE

Difficulty was experienced in interpreting some of the findings. Where granular casts occurred in the urine of a patient with hypertension, it seemed reasonable to make a diagnosis of chronic nephritis.

Headaches were complained of in 24·4 per cent. of eclamptics and 10·09 per cent. of controls (a proportion of 2·4 : 1).

In 12·7 per cent. of eclamptics and 5·69 per cent. of controls (proportion 2·2 : 1) there was complaint of occasional œdema of the feet.

In the group of eclamptics albumin was present in the urine of six patients (6·38 per cent.). Two women appear to be definite cases of chronic nephritis.

One, aged 55, had eclampsia 16 years ago, in her eighth pregnancy. Two years later she had albuminuria of pregnancy, and was delivered of a stillborn, full-time child. When examined recently she was found to have a blood pressure of 230 mm. She complained of swelling of her ankles and hands; both 0·05 per cent. albumin and granular casts were found in her urine.

The other, a woman of 46, had eclampsia five years ago, in her sixth and last pregnancy. When seen her blood pressure was 240/160, the blood non-protein nitrogen 50 mg., and her urine contained 0·05 per cent. albumin—though no casts were found.

Two other patients, with neither casts nor albuminuria, gave suggestive histories.

The first, aged 38, had eclamptic fits in her first pregnancy, 16 years ago. She was found to have a blood pressure of 188/118, and her blood non-protein nitrogen was 31·4 mg.; she had œdema of the legs and ankles, and has been treated several times since her eclampsia for "kidney trouble."

The other, aged 36, had eclampsia in 1926, when pregnant for the fourth time; she had antepartum hæmorrhage with albuminuria in 1929, and acute nephritis in 1930. When examined, her blood pressure was 200/120, and she complained of œdema of the face and hands. It seems highly probable that the acute nephritis in 1930 was an exacerbation of a chronic condition.

Of the controls, albumin was found in two cases (0·91 per cent.), and in one of these, a woman of 48, the blood pressure was 238/156. This patient had typhoid fever 19 years previously, and according to Thayer,[11] the incidence of arterio-sclerosis is much higher after typhoid fever than in individuals who have not been affected. This may account for the high blood pressure in this case. These observations are set forth in Table III.

TABLE III

	Hyper-tension.	Albuminuria.	Prob. chronic nephritis.
	Per cent.		
Eclampsia ..	35·1	6·38	4·29
Controls ..	28·8	0·91	† Nil.

Two further cases are examples of eclampsia occurring in women with pre-existing chronic nephritis.

One, aged 47, gave a history of having had nephritis at the age of 7. There is no record of her first pregnancy; she had eclampsia in her second, and albuminuria occurred in each of the subsequent five pregnancies. When examined, her blood pressure was 168 mm., but no albumin or casts were found in her urine.

A second, aged 50, who had scarlet fever as a child, was traced through the courtesy of her doctor, but was unable to attend. She was treated for chronic Bright's disease after her second and during her third and fourth pregnancies, which ended prematurely. No information is available about the fifth; she had eclampsia in her sixth pregnancy, and apoplexy 18 years later, but is still alive.

On reviewing the known causes of death, together with the condition of patients seen, it becomes evident that chronic nephritis is found more frequently after eclampsia than in normal women. It is also clear that albuminuria and hypertension are more commonly found in the former group than in the latter. Christian and O'Hare [12] state that hypertension alone

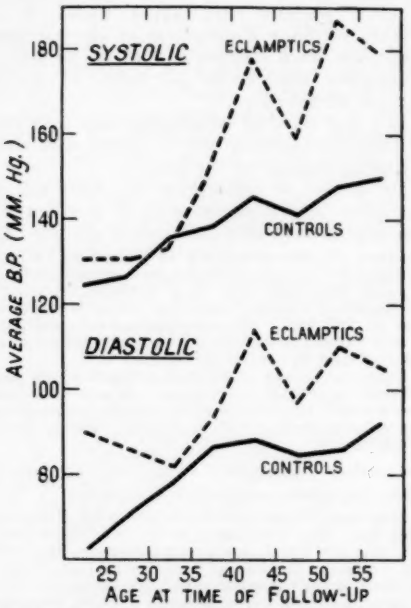

Chart showing the average blood pressure (systolic and diastolic) at various ages in women who have previously had eclampsia and those who have not.

should not be considered evidence of chronic nephritis. After one examination it is frequently impossible to make a diagnosis between renal disease and hyperpiesia—the term applied by Allbutt [13] to hypertension associated with arterio-sclerosis. Arterio-sclerosis is commonly associated with intoxications and infections, and it seems possible that the eclamptic toxæmia may damage the kidneys or the arterial system or both.

TABLE IV.

Condition on examination	Condition at time of eclampsia.				Type.
	Under 30.	30 and over.	Primip.	Multip.	A.P. Eclamp.
Total —94	66 (70·2 %)	28 (29·8 %)	59 (62·7 %)	35 (37·3 %)	58 (61·7 %)
Nephritis —4	1 (25 %)	3 (75 %)	1 (25 %)	3 (75 %)	4 (100 %)
B.P. 160 and over —18	7 (38·9 %)	11 (61·1 %)	7 (38·9 %)	11 (61·1 %)	14 (77·7 %)
Nephritis at time of death —5	—	5 (100 %)	—	5 (100 %)	5 (100 %)

Peckham [14] has found in his series of cases that nephritis was present one year after an eclamptic attack, in 12·2 per cent. of primiparæ and in 39·3 per cent. of multiparæ. He also found age to be a predisposing factor, nephritis occurring in 11·8 per cent. of cases under 19, in 13·8 per cent. between 20 and 29, in 63·6 per cent. between 30 and 39, and in 66·6 per cent. over 40. Of "mild eclamptics" returning with nephritis, he found all in the antepartum group, while after the "severe type" the nephritics were distributed amongst the ante- and postpartum cases.

The findings discussed in this paper support those of Peckham. Of the five women who have died of nephritis, or who are known to have had it at the time of death, *all* were multigravidæ over 30 at the time of the attack, and in all the eclampsia was of the antepartum type. Of the four patients seen in whom chronic nephritis was diagnosed or suspected, three were multiparæ over 30 when they had eclampsia—which was antepartum in two cases and postpartum in the other two. Though at the time of examination a diagnosis of nephritis was made in only four cases, a further 18 women had a systolic pressure of 160 or over, and of these, 11 were over 30 years of age, and 11 were multiparæ when they had eclampsia, which was antepartum in 13.

These figures are very striking, for of the 94 women seen, 60 were under 30 and 28 were 30 or over when they had eclampsia, while 59 were primiparæ and 35 multiparæ. The antepartum type occurred in 58 (61·7 per cent.). (Table IV.)

SUBSEQUENT FERTILITY

In order to discover what, if any, effect these toxic conditions have on fertility, a careful history was taken of subsequent pregnancies in all cases seen. Pregnancy occurred again in 60·6 per cent. of women after having had eclampsia, and in 56 per cent. of normal women after the control pregnancy. Thus more eclamptics than controls actually became pregnant again.

Though ability to conceive does not appear to be lessened by an attaek of eclampsia, miscarriages appeared to be common in this group, and the subsequent pregnancies have, therefore, been analysed. In the eclamptic group, miscarriages occurred in 22·8 per cent. of women, and of the controls in 15·5 per cent. In what proportion of women abortion was procured through fear of a repetition of the toxic condition is not known. (Table V.)

TABLE V

—	Eclampsia.	Control.
	Per cent.	
Reoccurrence of pregnancy	60·6	56·0
Miscarriage	22·8	15·5
Subsequent pregnancy complicated by albuminuria	8·5	0·46
Full-time pregnancy terminating in stillbirth	10·52	4·9

James Young [15] has drawn attention to the "surprising frequency of recurrence of toxæmia in eclamptic cases," and has noticed the existence of what he calls the "abortion-premature birth-toxæmia sequence." By piecing together previous and subsequent histories of all the cases traced, it has been possible to collect a number of cases in which such sequence occurs. Of cases traced a sequence is shown in 31. In 12 of these there is a recurrence of eclampsia, and five patients had normal pregnancies or abortions between the eclamptic attacks. One woman had eclampsia three times. In nine patients eclampsia started the sequence, being followed by abortion or toxæmia, and in six cases being preceded by normal pregnancies, while in the remaining ten cases, the sequence started with an abortion and went on to eclampsia.

The sequence may be represented as follows:—

Recurrence of eclampsia.—Twelve cases, of which two examples are given.

(1) Eclampsia. (2–7) Normal. (8) Eclampsia.
(1–5) Normal. (6) Eclampsia. (7) Eclampsia. (8) Abortion.

Eclampsia starting sequence.—Nine cases, of which two examples are given.

(1) Eclampsia. (2–4) Toxæmia. (5) Abortion. (6) Toxæmia.
(1–3) Normal. (4) Eclampsia. (5) Toxæmia.

Abortion-eclampsia sequence.—Ten cases, of which two examples are given.

(1–3) Normal. (4 and 5) Premature Birth. (6) Abortion. (7) Eclampsia.
(1–4) Normal. (5) Abortion. (6–14) Normal. (15 and 16) Abortions. (17) Eclampsia.

Conclusions

(1) In normal parous women there is a steady rise of blood pressure with increasing age, at any rate up to the age of 60. There is a slight depression between the ages of 40 and 50. After eclampsia the blood pressure rises more rapidly and to greater height. The depression occurs as on the control curve, but is exaggerated, and the readings at the upper end are modified by death of the worst cases. There is a fairly definite indication (after an initial drop) of a rise with advancing time; and a slight indication of a rise of blood pressure with further pregnancies.

(2) Chronic nephritis develops in a number of women after eclampsia and this, in some cases, is severe enough to cause early death.

(3) There appears to be a direct relation between the age and parity of the patient, and the occurrence of hypertension and nephritis. Both are more liable to occur in multigravidæ who are over 30 at the time of the attack. Both occur more frequently after the antepartum type.

(4) There is no evidence that subsequent conception is rendered less likely by an attack of eclampsia. Fertility is lessened after this condition in that miscarriage and stillbirth occur more frequently than in normal women. Albuminuria is much more likely to complicate subsequent pregnancies after eclampsia than in normal cases.

(5) In a certain number of cases a "toxæmia sequence" occurs. Eclampsia may begin or end the sequence or may itself recur.

I am indebted to the staff of the Jessop Hospital for Women, Sheffield, for permission to use the case records of the hospital. I tender my grateful thanks to Prof. Miles H. Phillips and Mr. W. W. King for valuable assistance and advice, and also to Mr. J. R. Thompson, D.Sc., of the University of Sheffield, who has given me invaluable help with the statistical data available.

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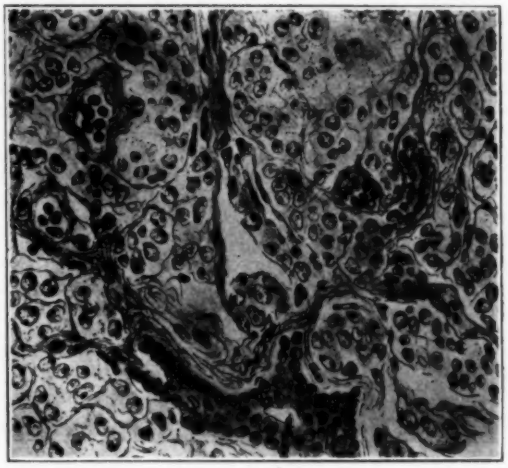
INFLUENCE OF THE SEXUAL CYCLE ON BREAST LESIONS

BY HELEN INGLEBY, M.B., M.R.C.P. LOND.
PROFESSOR OF PATHOLOGY IN THE WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA.

THOUGH a revolution in the interpretation of pathological lesions has followed Rosenberg's [1] discovery of the sexual cycle in the breast, even now the full extent and significance of these changes is sometimes scarcely realised. The proliferation of glandular elements during the premenstrual phase is far more rapid than the growth of a carcinoma. Their post-menstrual regression is equally astonishing; after a few days the only traces of the former lobule are one or two clefts barely visible in the fibrous tissue which has closed in and obliterated the site of the glandular mass. It is easy to see that even a slight upset in the mechanism of periodic growth and involution will have far-reaching consequences.

The most common benign tumour of the breast is known variously as fibro-adenoma, adeno-fibroma, and periductal fibroma. By comparing sections of breast and tumour from a series of cases in which the menstrual date was known it was found that in every one the tumour showed changes parallel to those in the surrounding normal breast. That is to say, in the premenstrual phase, new lobules formed in the tumour, although not as perfectly as in the breast; during menstruation the tumour ducts might be distended with secretion and shed cells; after

FIG. 1



A

Aged 33. Carcinomatous lobule from a breast removed 12 days before the onset of a period. The main duct (A) shows slight hyperplasia of the living cells but no cancer. It is surrounded by ductules; their outlines are still visible but in every one the epithelial cells are carcinomatous. This lobule was probably formed during the previous premenstrual phase but did not undergo involution since all its cells became cancerous.

menstruation many ducts underwent involution; in the interval phase the periductal fibrous tissue was dense and the epithelium had resumed the appearance typical of the resting state. The breast cycle was reflected in the tumour, but not perfectly. Had growth and regression been perfect there would have been no tumour. The tumour existed only because some local upset had marred the regular development

[1] Frankfürter Zeit. für Path., 1922, xxvii., 466; Virchows Archiv für. Path. Anat., 1926, cclxii., 298.

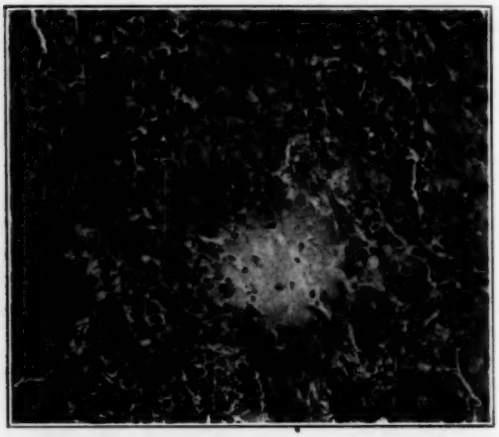
of the cycle. The varied appearances assumed by a fibro-adenoma depend upon which element or elements, epithelium or fibrous tissue, is at fault and in what direction (overgrowth, excessive secretion, defective involution, degeneration, &c.).

Just as fibro-adenoma is the result of a local irregularity in development and involution, so the lesion known as "chronic mastitis," or better, mazoplasia,* is the effect of a general irregularity in the cycle changes. The condition occurs most commonly in girls about puberty and in women nearing the menopause, but is found particularly in association with irregular menstruation in women of any age. A similar condition can be produced in rats by upsetting the œstrous cycle.

The lesions in fibro-adenoma and chronic mastitis have a direct relation to cycle changes. But even in carcinoma the sexual cycle cannot be left out of account. In women of the childbearing age it is of the utmost importance in explaining a common mode of spread of the growth and in accounting for some of its morphological appearances.

There is some substance given off by a carcinoma which induces hyperplasia in surrounding cells. For example, in the beginning stages of epithelioma of the skin it is common to find hyperplastic skin papillæ, showing early malignant change, at a distance from the main growth. In the breast, hyperplasia resembling that of the premenstrual phase is often seen in the neighbourhood of a malignant growth while the rest of the breast is in the resting stage. Not all hyperplastic tissues become malignant because, as F. S. Hammett and F. R. Reimann have shown,

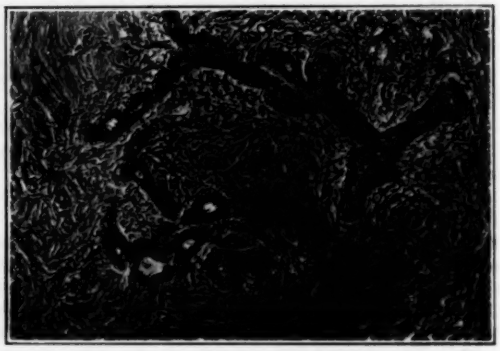
FIG. 2



Aged 36. Section taken near the edge of a carcinoma. Breast removed on the fourth day of menstruation. Groups and columns of cancer cells are seen surrounded by fibrous tissue. In the fibrous tissue are clefts, the remains of ductules which have undergone post-menstrual involution.

fully differentiated epithelial cells do not divide. Malignancy is only possible in those cells which for some reason do not differentiate fully. As regards squamous cell carcinoma it could be objected that the hyperplasia of adjacent skin going on to carcinomatous proliferation was not due to the presence of the primary growth but to the same factor that caused the original tumour. In the breast, however, I have shown that carcinoma in the main duct does induce carcinomatous proliferation in the cells of the lobules.[2] In breasts removed in the premenstrual phase, all stages from normal premenstrual proliferation to carcinoma can be

FIG. 3



Aged 36. Normal lobule from the same breast as Fig. 2. Post-menstrual involution is nearly complete. The ductules have disappeared except for the clefts which mark their site. Only the larger ducts remain.

traced in favourable sections in the newly formed lobules. The fact that the cells in the main duct, which are the result of many divisions, have in some cases a totally different appearance from the newly forming carcinoma cells in the lobules, shows that the growth in the lobules is not due to migration there of cancer cells from the main duct. The mode of spread by carcinomatous transformation of the newly formed cells of premenstrual lobules will explain why, in younger women especially, carcinomatous nodules are found scattered through a breast, as Cheatle showed many years ago, in the territory covered by an affected duct and its branches.

Under the microscope most breast carcinomas bear no resemblance to the normal tissue, a fact which has puzzled generations of students. A study of what happens to cancer during the sexual cycle changes in the breast will show how some of the microscopical appearances arise.

When a premenstrual lobule comes under the influence of a carcinoma in one of the larger ducts it is possible either for the cells in the whole or the greater part of the lobule to be affected or for only one or two of the ductules to undergo carcinomatous change. The events in the first of these alternatives will be as follows: (*a*) The cancer cells in each ductule grow and divide. The lumen of the ductule is obliterated and its architecture soon lost. Of course no post-menstrual involution takes place in the carcinoma cells and before long the periductal connective tissue is encroached upon and destroyed. By the time the next premenstrual phase is due the outlines of the former ductules are barely distinguishable (see Fig. 1). Soon all that is seen is a round or ovoid clump of cancer cells occupying the former site of the lobule. But owing to the destruction of the connective tissue the blood-supply is cut off from the centre of the mass. The centre then degenerates and finally there is a clear central space surrounded by a ring of cancer cells. These are not ducts as has sometimes been supposed. They are lobules which have become carcinomatous "en masse" and whose centres have degenerated.

* Lenthal Cheatle uses the term "mazoplasia" to denote extreme physiological hyperplasia and desquamative cystophorous hyperplasia to denote the pathological condition. Mazoplasia has here a broader significance in that it includes cystic dilatation of ducts and any intracystic proliferation which can be ascribed to the premenstrual stimulus.

[2] Arch. of Pathol., 1929, viii., 653.

(*b*) If only one or two ducts have become carcinomatous then the rest of the lobule undergoes the usual post-menstrual involution. The periductal fibrous tissue closes in. In the cancerous ductules the architecture is lost but the cells remain (Figs. 2 and 3). They remain as a column because of the pressure of the fibrous tissue outside. The column may be one or many depending on the number of ductules involved. Since cancer grows in the line of least resistance the cells are more likely to grow along clefts than in other directions. This accounts for the arrangement of cells in rows so often seen in carcinoma of the breast.

The observations recorded here were made from a study of six breasts from women ranging in age from 31 to 42. In none was the carcinoma complicated by other lesions. It is hoped to make cancer in older women the subject of a separate communication.

ON THE USE OF SANOCRYSIN IN PULMONARY TUBERCULOSIS

By H. E. Mansell, B.M. Oxf., M.R.C.P. Lond.
MEDICAL REGISTRAR TO ST. GEORGE'S HOSPITAL

This paper is concerned with 153 tuberculous patients, who were treated with sanocrysin in Brompton Hospital during the three years 1926–28. Its publication is justified by the fact that, although the drug has been in clinical use for over seven years, there is yet no consensus of opinion as to its dosage, mode of action, and the type of case in which its use is indicated.

The patients were treated independently by the physicians under whose care they had been admitted. The obvious disadvantages of such separate observation have been more than counterbalanced by the fact that on some points the conclusions reached are similar and have thus received independent corroboration. The usual indication for sanocrysin was in patients not improving with conservative treatment and yet unsuitable for collapse therapy. It was also used in conjunction with artificial pneumothorax, phrenic avulsion, and thoracoplasty.

CLASSIFICATION OF CASES

It has been claimed that sanocrysin is more effective in the recent exudative type of case than in the fibrotic, and in order to investigate this point a fairly elaborate method of classifying the cases was considered essential. Of the available methods, that of Lyle Cummins [1] was adopted. He suggests a primary division of cases into two main types :—

1. Acute and initial (A), when the progress of the illness has been continuous from the start, without healthy intervals of any considerable duration.
2. Chronic and recrudescent (C), when there have been previous signs of tuberculous infection such as hæmoptysis, pleurisy, bone or joint or gland, abdominal or pulmonary infection, but where these have been separated from the present illness by periods of relatively good health. All cases over two years' standing are to be classified under this heading.

He subdivides each of these two main groups into three, using the international classification to denote the degree of lung involvement :—

1. Disease of slight severity limited to a small area of one lobe.
2. Disease of slight severity more extensive than (1), but affecting at most the volume of one lobe. Or disease of greater severity affecting at most the volume of half a lobe.
3. All cases of greater extent than (2), and all cases with considerable excavation.

For general purposes the stage should be assessed in accordance with the obvious clinical signs, but in this investigation the skiagraphic appearances have been taken into consideration, with the idea of obtaining a more accurate and more valuable assessment.

He makes a final subdivision according to the Inman method into (*a*) resting febrile ; (*b*) resting afebrile, ambulant febrile ; and (*c*) ambulant febrile.

It will be seen that by this method a classification consisting of 18 groups is obtained. The distribution of the 153 cases under discussion is given in Table I.

TABLE I

A1(*a*), A1(*b*), A1(*c*)	No cases.	C1(*a*)	1 case.
A2(*a*)	3 „	C1(*b*), C1(*c*), C2(*a*)	No cases.
A2(*b*)	2 „	C2(*b*)	1 case.
A2(*c*)	2 „	C2(*c*)	2 cases.
A3(*a*)	53 „	C3(*a*)	58 „
A3(*b*)	5 „	C3(*b*)	6 „
A3(*c*)	3 „	C3(*c*)	17 „

DOSAGE

During the early days large doses of sanocrysin were employed. It was usual to give an initial dose of 0·25 g. and end the course with three or more injections of 1 g. (in one case as many as seven injections of 1 g. were given). With added experience, however, it was unanimously found that each case must be considered individually on its merits, and there was a definite tendency to use smaller doses. Thus in 1926, out of 43 patients 22 received 6 g. or over, and of the remaining 21 more than half received 4 g. or over. In 1927 and 1928, out of 110 patients only 7 received 6 g. or over, and of the remaining 103 less than a third received 4 g. or over. Moreover, the first dose was usually only 0·05 or 0·1 g., and latterly it became the exception rather than the rule for final doses to exceed 0·5 or 0·75 g. The aim was to produce a moderate reaction and avoid strong reactions as far as possible. An interval of at least a week was allowed between injections, the total time taken to complete a course of 4 to 6 g. depending entirely on the degree of reaction produced and the subsequent spacing and increase rate of doses.

Two or more courses were given to 12 patients. This procedure appeared sound on theoretical grounds, and the results were encouraging. Ten cases showed improvement, three of them being "much improved." Of these, one showed improvement in symptoms and physical signs and, although a skiagram after the first course suggested an increase of infiltration, another taken after the second course showed marked improvement.

TABLE II

	Cases and per cent.
Temperature :—	
Evening rise (Type 2 of Secher [2])	114 (74)
Delayed rise (Type 3)	2 (1½)
Sustained rise (Type 4)	6 (4½)
Absence of temperature (Type 5)	31 (20)
Albuminuria	42 (27½)
Skin rashes	31 (20)
Affections of mucous membranes :—	
Conjunctivitis	2 (1½)
Metallic taste	18 (12)
Sore tongue	2 (1½)
Sore-throat	3 (2)
Stomatitis	3 (2)
Gastro-intestinal symptoms :—	
Vomiting	47 (31)
Diarrhœa	38 (25)
Abdominal pain	21 (13½)
Focal reaction	6 (4)

REACTIONS

The following reactions, similar to those recorded by previous writers, were noted as occurring after sanocrysin treatment (Table II.).

Malaise lasting 24 hours or so was complained of in almost every case. Cramps and joint pains occurred in 11 cases, drowsiness in 20 cases, night-sweats in 5 cases, and rigors in 23 cases. Type 3 of temperature reaction was in both cases associated with the appearance of a rash. Type 4 was found in children, in patients destitute of resistance, and as the result of excessive dosage. Of the 31 cases in which Type 5 was encountered, 7 were acute and initial, and 24 were chronic and recrudescent. This distribution supports the view of previous observers that absence of temperature reaction is found in cases where fibrosis is the predominant pathological feature. When albuminuria occurred, it was considered inadvisable to give the next dose of sanocrysin until the urine was clear. The occurrence of a skin rash was not considered an indication to discontinue the treatment, provided that special care was taken with subsequent doses. In only one case was diarrhœa severe enough to necessitate abandonment of the treatment. Focal reaction took the form, subjectively, of pain and tightness in the chest, dyspnœa, and increased cough and sputum; objectively, of an increase in the number of râles.

IMMEDIATE RESULTS

In attempting to assess the immediate results of the treatment, I have taken four factors into consideration: (1) disappearance of bacilli from the sputum; (2) general symptomatic improvement as connoted by lowered temperature and pulse-rate, diminished or absent cough and sputum, absence of lassitude, improved appetite, and increasing weight; (3) changes in physical signs in the direction of fibrosis and diminution in the number and extent of moist sounds; (4) skiagraphic changes suggesting diminished infiltration and increase of fibrosis. Each patient has been marked in these four categories, a half or whole mark being given according to the degree of improvement. Maximum improvement would thus be denoted by +4. Patients showing only $-\frac{1}{2}$ or $+\frac{1}{2}$ have been regarded as unaffected by sanocrysin.

In 36 cases no record of the sputum findings was available, and 9 patients were negative throughout their stay in hospital. Of the remaining 108 cases with a positive sputum, 49 became negative during treatment, a bacillary loss of 45 per cent., which is comparable with the 43·9 per cent. given by Stub-Christensen [3] as the figure for his early period, when many unsuitable cases were included. In five cases the sputum became positive during treatment; in two of these it remained positive, while in three it became negative again before the end of the course. It was disappointing to find that the disappearance of bacilli was in a large number of cases not permanent. Thus, of the 49 cases who showed disappearance of bacilli during treatment, no less than 29 were known to have become positive again within three months, and probably there were others, as it was not found possible to follow up every case on this point.

TABLE III

	Cases and per cent.	
Died	3 (2)	
Worse	14 (8½)	
Unchanged	34 (22)	
Improved	78 (51½)	=67½ per cent.
Much improved	24 (16)	

The general results are given in Table III. "Improved" denotes less than +3; "much improved," +3 or over.

The relative results in the two main groups of cases are given in Table IV.

TABLE IV

—	Cases.	Died.	Worse.	Unchanged.	Improved.	Much improved.
		Cases and per cent.				
Group A	68	3 (4½)	5 (7½)	9 (13½)	32 (47)	19 (27½)
Group C	85	0	9 (10)	25 (30)	46 (54)	5 (6)

Group A, it will be seen, contributes a large proportion of the "much improved" cases, but also the only three cases who died during treatment. It may be noted here that of the 19 Group A patients classed as "much improved," 14 were 25 or under in age, and 10 of these were actually only 21 or under. Group C includes a relatively large number of unaffected patients, but also shows quite a high percentage of improvement if the total results are taken:—

Group A .. .. 51 improved =74½ per cent.
„ C .. .. 51 „ =60 „

These facts support the generally accepted view that dramatic results are more likely to be obtained in young patients with recent exudative disease, and that fibrotic cases, although apt to be unaffected by sanocrysin, do frequently show some improvement.

The relative results in 1926, when large doses were used, and in 1927–28, when more caution was employed, are given in Table V.

TABLE V

Year.	Cases.	Died.	Worse.	Unchanged.	Improved.	Much improved.
		Cases and per cent.				
1926 ..	43	0	5 (12)	12 (28)	19 (44)	7 (16)
1927–28.	110	3 (3)	9 (8)	22 (20)	59 (53½)	17 (15½)

The difference is not striking, but enough to warrant the use of small doses, at least in the severe type of case under discussion.

SANOCRYSIN AND ARTIFICIAL PNEUMOTHORAX

Several patients in this series at some time or another received collapse therapy as well as sanocrysin, but only those will be included here who were treated "de novo" with the combination. The combined method was used in 18 cases; in 11 of these collapse was induced on the worse side while gold was given for the other lung; in two cases treated in the first place with pneumothorax for unilateral disease, sanocrysin was given for fresh infiltration in the other lung; in two cases sanocrysin was combined with bilateral pneumothorax; and in three cases of unilateral disease collapse therapy was found to be insufficient and the combination was used. The results are given in Table VI.

TABLE VI

	Cases and per cent.	
Worse	4 cases (22)	
Unchanged	No „	
Improved	10 „ (56)	=78 per cent.
Much improved	4 „ (22)	

No final conclusion can be drawn from such a small number of cases, but the figures certainly lend some support to the view that sanocrysin is of value in conjunction with collapse therapy.

SANOCRYSIN WITH THORACOPLASTY

Five cases were treated with this combination. One case will not be considered in detail, because thoracoplasty was performed much later as treatment for a spontaneous pneumothorax that arose in the interval between two courses of sanocrysin; the treatments were in no sense used in conjunction. The value of this combination can best be indicated by a brief account of the other four cases.

No. 2, a man of 33, had a large right hydropneumothorax, the result of a spontaneous pneumothorax five weeks before, and scattered infiltration in the other lung. Temperature 101–102/98–99° F. After sanocrysin treatment his condition was greatly improved, sputum still positive, but evening temperature only occasionally rising to 99° F. He was then successfully operated upon by thoracoplasty, and his present condition, four years later, is good.

No. 11, a man of 39, was admitted with a right pyopneumothorax, which had arisen in an artificial pneumothorax initiated a year previously. The left lung showed no clinical or skiagraphic evidence of infiltration. The sputum was positive, and the evening temperature 100° F. As a result of sanocrysin treatment his general condition improved, evening temperature fell to 99° F., and the sputum became negative. Phrenic avulsion and thoracoplasty were then performed. Four years later he is alive, but has been bedridden for the last 12 months.

No. 96, a man of 29, was admitted with bilateral disease of considerable extent, sputum positive, and temperature 99·4° F. at night. Phrenic avulsion and thoracoplasty were performed on the left side, which was the more diseased of the two, and six weeks after the operation the patient had made an excellent recovery, the amount of sputum had been reduced from 2 oz. to ½ oz. daily, but the evening temperature of 99·4° F. persisted. A course of sanocrysin was given, after which he was able to go to Frimley afebrile and with negative sputum. He is now alive and in good health, two years afterwards.

No. 127, a widow of 39, was admitted with an evening temperature of 98·4–100° F. Clubbing was present, and the sputum was positive. A right artificial pneumothorax had been initiated eight months before, and X ray now showed the diaphragm on that side high and adherent, with much basal fibrosis but no fluid. Phrenic avulsion and thoracoplasty were performed, after which the temperature settled for a time, but two months after the operation it had risen again to 101·5° F., and X ray now showed scattered infiltration in the left upper and middle zones. Although the fever again showed signs of settling, a course of sanocrysin was given; after the second dose the sputum became negative and remained so, and she was eventually discharged to Frimley afebrile and gaining weight. She is now in good health, two years afterwards.

These cases suggest that sanocrysin has a value, either in preparing a patient for thoracoplasty or as treatment for the better side in cases of bilateral disease where the operation is performed on the worse side. It will be convenient to include under this heading a case in which sanocrysin was combined with phrenic avulsion for the latter purpose.

No. 104, a girl of 23, was admitted complaining of cough and loss of weight since broncho-pneumonia and pleurisy two years before. She was somewhat cyanosed, with slight clubbing of the fingers and an evening temperature of 99° F. She was found to have infiltration of the whole of her left lung, the base being especially involved, and infiltration of the upper and middle zones of the right lung. Left phrenic avulsion was followed by a reduction of sputum from an ounce to a drachm daily, but her general condition remained unaltered and she was unable to get up without rise of temperature. After a course of sanocrysin she was discharged to Frimley, afebrile and up for six hours daily, with negative sputum and a gain in weight of 10 lb. She is now alive and in very fair health, two and a half years afterwards.

AFTER-HISTORY

Of the total number of 153 patients, 142 (93 per cent.) have been successfully followed up, and only 11 could not be traced. In view, however, of the several uncontrollable factors involved, it was considered that nothing would be gained by a statistical examination of the after-histories of these patients.

DISCUSSION

This paper is in no wise an attempt to estimate the value of sanocrysin in pulmonary tuberculosis. The criteria to be observed in such a task have been admirably stated by Walters,[4] and include not only a similar group of control cases under similar conditions, but also a knowledge of how the remedy should be employed, how it acts, and under what conditions. Neither of these criteria was available, the first because the routine of a metropolitan hospital makes such control experimentation impracticable, and the second because the knowledge in question has yet to be discovered. Amberson and his fellow-workers [5] have set an example of the carefully pre-arranged plan to be followed in a clinical test of a chemotherapeutic agent, but their conclusions as to the undesirability of sanocrysin treatment cannot be accepted as final until the work has been repeated with different dosage and less advanced types of case. On these questions of dosage and type of case certain conclusions may be drawn from the present series of cases and from the published literature.

The dosage controversy reached its culmination, after seven years, in a recent issue of THE LANCET, when in consecutive papers Secher [6] advocated the large dosage, and Allon Pask [7] stated that he had discontinued using doses larger than 0·75 g. All workers are agreed that some degree of reaction to the drug is desirable, and reaction depends on two factors, the type and extent of the tuberculous process and the dosage of sanocrysin. The more severe the type of case, therefore, the smaller must be the dose if disastrous reactions are to be avoided. Examination of the results published by advocates of small doses reveals the fact that the cases treated were mostly of advanced type. Wurtzen and Sjørslev [8] treated 145 cases with small doses and found improvement in 88 (68 per cent., as compared with 67½ per cent. in the present series); the cases were of advanced type. Faber [9] compared the results of large and small dosage in two groups of cases and obtained better results with the latter; both groups consisted chiefly of Type II. and Type III. patients. In the present series smaller doses were gradually adopted, and the most striking fact which emerges from examination of the clinical material is that a very large proportion of the cases are classified as A3(*a*) or C3(*a*), while not a single case is to be found in classes A1(*a*), A1(*b*), A1(*c*), C1(*b*), C1(*c*), and C2(*a*).

On the other hand, Secher,[6] who adheres steadfastly to the larger doses and who claims "cure" in a considerable number of cases, states clearly that in his opinion "an advanced stage is a contra-indication to sanocrysin, as the patient will be unable to stand the intoxication produced by the treatment." He now reserves sanocrysin for cases where cure, or at any rate considerable improvement, can be anticipated. Stub-Christensen [3] found that large doses were as well tolerated as small by Stage I. patients. Case 1 in this series, who during his course received no less than seven injections of 1 g., was an early case with only eight months' history and afebrile at rest. He showed both symptomatic and skiagraphic improvement at the time of treatment, and five years later was well and working eight and a half hours a day.

Finally it should be noted that Amberson's [5] cases were all either moderately or far advanced, and that he employed a dosage which many would consider too large for the type of case, a fact which may explain his disappointing results.

What is the conclusion? Clinical evidence is accumulating to show that in cases of extensive exudative disease sanocrysin in small doses often has a beneficial immediate effect which may be at least of economic value. There is yet no convincing

evidence that this effect is lasting, in fact such a contingency is unlikely in the type of case under consideration. The following indications are suggested for its use:—

(1) In cases of active infiltration, where for any reason the time factor is important, it being reasonable to infer from these cases that the improvement shown in general condition, physical signs, and skiagraphic appearances would have taken longer to obtain by ordinary methods of treatment.

(2) In certain cases which remain pyrexial on exercise after three months' institutional treatment: (*a*) cases in which collapse therapy is impossible owing to adhesions or any other cause; (*b*) cases which have already been treated by artificial pneumothorax, phrenic avulsion, or thoracoplasty.

(3) In certain cases in conjunction with one of the forms of collapse therapy.

(4) In cases of extreme gravity, where all other treatment has proved unavailing, in view of the fact that results little short of miraculous have been recorded after its use.

The case for the use of large doses in treating the disease in its early stages remains unproven, and it is suggested that there is a real need now for further investigation of this question on the lines laid down by Amberson and his colleagues.[5]

SUMMARY

A review of 153 patients treated with sanocrysin shows that the most dramatic effect, in the direction either of improvement or the reverse, is obtained in young patients with exudative disease, and that fibrotic patients, although more likely to be unaffected, do in a considerable number of cases show definite improvement. Promising results are obtained from its use in conjunction with artificial pneumothorax, phrenic avulsion, and thoracoplasty. There is need for further controlled investigation, particularly of the effect of large doses on early cases showing a relatively slight degree of lung involvement.

My sincere thanks are due to the honorary medical and surgical staff of the Brompton Hospital for permission to use their cases in this investigation. It was carried out with the aid of a grant from the Hospital Research Fund.

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HOME ACCIDENTS.—A "safety in the home" committee has been formed at Sheffield in consequence of the large number of indoor accidents, especially to children and old people. It is stated that whereas traffic accidents treated at Sheffield Royal Hospital are only 4 per cent. of the casualties treated, domestic accidents amount to 20 per cent.

REMEDIAL PHYSICAL TREATMENT AT KING'S COLLEGE HOSPITAL.—Last week Dr. Barrie Lambert, chairman of the public health committee of the London County Council, opened an extension of the physical treatment department of King's College Hospital. Lord Gorell, the chairman of the hospital, stated that in 1921 the number of patients in the department was 35,200; last year it was 60,500, and this year the number has increased to 110,000. The number of massage students has grown from 30 to 70, and in an examination open to all England, King's College students took first and third places. The new premises were formerly the students' refectory.

MANIPULATIVE SURGERY IN GENERAL PRACTICE *

BY A. S. BLUNDELL BANKART, M.CHIR. CAMB., F.R.C.S. ENG.

ORTHOPÆDIC SURGEON, MIDDLESEX HOSPITAL; SURGEON TO THE ROYAL NATIONAL ORTHOPÆDIC HOSPITAL

IT is now the fashion to speak of manipulative surgery, but the term has nothing to commend it. There is no conceivable reason why the simple procedure of moving a joint or joints for therapeutic purposes should be exalted into a special branch of surgery with a high-sounding title like "manipulative surgery." The term was invented, not by us, but by a bone-setter who, having achieved considerable popularity, decided to call himself a manipulative surgeon and thereby seek to attain to the higher status which such a name implies.

Manipulation is not a highly specialised branch of surgery with a difficult and mysterious technique which can be practised only by a few highly trained or specially gifted individuals. It is really the simplest thing in the world, if you only know, and it can be done by anyone who has two good strong hands and an inclination for minor surgery. It is done regularly by my young house surgeons and registrars as a part of their routine work. I do not deny that a certain facility in manipulation is acquired by practice and experience, but, after all, that is true of all manual procedures, whether at work or at play.

It is true that surgeons generally were slow to appreciate what might be done by manipulation in certain cases, and that the conspicuous success, not of one, but of many bone-setters was one of the factors which compelled their attention. But there were reasons, if not excuses, for this tardy recognition. In the first place, surgeons were very much preoccupied with the abdomen and the bigger things of surgery. Orthopædic surgery itself was not officially recognised as a specialty in this country until the year 1913, and then only under vigorous protest from many of the older surgeons. Moreover, the obviously false diagnosis of "a small bone out of joint," upon which the bone-setters' practice was ostensibly based, was calculated to prejudice surgeons against it, and to blind them to the good which might be achieved empirically. Lastly, a very large proportion of the cases regularly seen in orthopædic practice have previously been treated by bone-setters, so that orthopædic surgeons were perhaps unduly familiar with the unsuccessful side of manipulative surgery. For there is an unsuccessful side, and it is well to appreciate the limitations as well as the possibilities of manipulation in surgery.

Many years ago I received a letter from a patient of mine—an intelligent, educated, middle-aged woman. She reminded me that some two years previously she had consulted me for pain in her feet due to flat-foot. While under my treatment she had done everything that I had told her to do. She had worn the special boots that I had ordered, with the wedges and the supports. She had had the massage and done the exercises which I had prescribed for her. But she had got no better, and she began to fear that she would be crippled for life. Then she consulted a bone-setter. "He" she wrote; "he, with his wonderful hands, put the bones of my feet back into

* A paper read at the Paddington Medical Society on Oct. 11th, 1932.

place, and now I am thankful to say I am cured. I have no pain in my feet; I can walk seven miles with ease and comfort; and I feel that a new lease of life has been granted to me." Now I take credit to myself that on receipt of that letter I realised that this was not an occasion for petty annoyance or for standing on my dignity. Here was a most typical case of one of the commonest complaints in orthopædic surgery, which I had treated, no doubt you will say very badly, and I agree, but at least I will say conscientiously and according to the accepted principles of all the leading orthopædic surgeons of the day. Yet I had failed miserably, and the patient had gone to a bone-setter who had promptly cured her.

I sat down and I asked myself three questions. First, was this genuine? Yes, undoubtedly it was. I knew this patient well, and I had no doubt that, whatever the explanation, she had been relieved of her pain. Besides, we had heard of many similar cases where patients had failed to get relief from orthodox treatment and had then been cured by bone-setters. So my second question was: what is it possible for a man (any man) to do to a foot with his hands alone? The answer is that, apart from rubbing or massage (with which we are not now concerned), he can do nothing except *move* it. In what way, then, can one man's movement or manipulation differ from that of another? We had often manipulated feet, when we thought it was indicated, but we had not had the dramatic successes that were claimed by bone-setters. The answer to this is that he can only move it with more force, or in a different direction, or both.

Now here was the key to a riddle which had puzzled surgeons for many years, and, like all riddles when you know the answer, it is extremely simple.

The Secret of the Bone-setter

The human foot is always described as a structure built in the form of an arch, and it is commonly believed that this arch is maintained, at least in part, by the ligaments and fasciæ of the sole, and that when these give way the individual suffers from flat-foot. This is a half-truth which is little better than a lie. The truth is that the natural foot, as seen in bare-footed races who have never worn boots or shoes, is completely flat when its muscles are relaxed and arched only when the muscles are in action. You may observe the same thing in the feet of the best ballet-dancers: their feet also are completely flat when standing at ease and highly arched only when their powerful muscles are in action. You can see it also in the feet of your own children, when they are beginning to walk. In short, the natural foot should be so supple, it should have such mobility, that it can be completely flattened or raised in the form of an arch at will, and the attitude of the foot at any moment is determined by the action of its muscles.

Unfortunately, nearly all civilised people from early childhood onwards encase their feet in stiff leather coverings—boots or shoes—with the result that much of the natural mobility of the foot is lost and the feet become fixed in a position of action—that is, with more or less of a fixed longitudinal arch. The individual is then compelled for ever more to keep his body-weight raised above this minimum height of arch, for otherwise he will press it down and stretch and strain the soft parts which are shortened and adapted to the arch. There cannot be strain without resistance. If a foot can flatten completely without resistance, it is painless, and the completely flat-foot nearly always is painless. People do not suffer from flat-foot, but from inability to flatten their feet—that is, from foot strain.

For years and years both the medical profession and the public have been obsessed with the idea of putting up, restoring, and supporting the arch of the foot. It has been a miserable failure. I do not deny that a slight so-called support may give a measure of relief in some early cases of foot strain, but the relief is usually short-lived. A rigid support converts the would-be supple foot into a rigid system without spring, elasticity, or comfort. The bone-setter, on the other hand, to give him his due, tumbled to the fact that the right treatment of a strained foot was to remove the resistance to flattening, to restore or increase its mobility, so that it could yield and flatten without meeting resistance. Note, then, how his movement or manipulation differed from ours. We had used as much force as he used. We had even on occasions used a spanner, a thing called a Thomas's wrench, which gives enormous leverage and far more force than can be applied with the hands alone. But we had always tried to push up the arch of the foot and to mould it into what we thought was its natural shape. He manipulated in exactly the opposite direction, abducting, everting, and flattening out the sole to the utmost.

The proof of the pudding is in the eating. For many years now we have manipulated all cases of foot strain, which is miscalled flat-foot. We do it better than the bone-setter, because we employ full anæsthesia and so have complete control of the foot. We do it more safely, because we can make a differential diagnosis and we do not manipulate indiscriminately cases of foot strain, tuberculous joints, and feet that are stiff from chronic arthritis. The results are most gratifying, for the great majority of cases are promptly relieved of their pain and disability.

Perhaps I can hear some of you say, "flat-foot as we know it is a most unsightly deformity, with its turned-out feet and its ungainly walk. Do you really mean to tell us that you deliberately make these people more flat-footed than before?" No, I don't. You will find that when they are relieved of their pain and stiffness by manipulation they begin to use their muscles normally again, and I have told you that the attitude of the foot is but an expression of muscular action. Massage and exercises here play a part in the after-treatment, and in this respect also we have improved on the empirical treatment of the bone-setter. Again I say, this is not all specialists' work which has nothing to do with general practice. These cases abound in general practice, and it is work that anyone can do who cares to do it.

How are you to recognise these cases? That is easy. The patient complains of pain in his feet, they ache when he has been on them, and he gets so easily tired. The pain is referred typically to the inner border in the region of the astragalo-scaphoid joint; commonly, also, to the outer side below and in front of the external malleolus; and sometimes to the fore-part of the foot. The condition is brought on by prolonged standing or over-use of the feet, or as the result of muscular debility, as on getting up after an illness. There may be a history of injury—a twist or sprain—some time before. Such cases, of course, are often unilateral. Now stand the patient up and look at his feet. You will probably say that he has flat-foot. But do not be deceived by the eversion of the foot as a whole. Take hold of the foot in your

hands, and move it about in all directions, and particularly try to flatten out the sole. You will find that the movements are more or less restricted, and that in the traumatic cases there is usually stiffness and some pain on inversion as well as on eversion of the foot. If the foot is rigid from arthritis, leave it alone, or at least be cautious in your prognosis. Otherwise, manipulate without hesitation.

The manipulation consists in forcible movement of the foot in all directions, but particularly in the direction of abduction and eversion, and I must add that it is a man's job. Make no mistake about this; the manipulation is forcible and even violent. The manipulation of an adult foot often requires all the strength that a strong man can put into it, and I defy you to damage an adult foot with your hands alone. Next morning, put a good masseur on, and tell him to mobilise the foot and give exercises. The shoes, provided that they are well made and of a good shape, may be of the ordinary conventional type. A well-known bone-setter is said to have made two-thirds of his fortune by simply moving feet that other people would not move. It was not a stunt or deception practised on a credulous public, but perfectly sound surgery—empirical, it is true, but effective.

Twists and Sprains of the Knee

Now many, perhaps most, orthopædic surgeons would put the knee first among the joints which most often require manipulation. Personally I should put it third. But at any rate chronic sprains of the knee are very common, and the bone-setter might well have made approximately the other third of his fortune by empirically moving knee-joints that other people would not move. I use the word "empirically" deliberately, because I have evidence that this manipulation, too, was based upon an erroneous idea of the pathology of the condition—yet it served its purpose.

Twists and sprains of the knee-joint are very common. The usual mechanism is that, while the foot and leg are fixed upon the ground and the knee is slightly bent, the femur is forcibly rotated inwards by the whole momentum of the moving body swinging inwards. This movement of rotation actually takes place between the upper surface of the head of the tibia and the under surfaces of the semilunar cartilages. When the head of the tibia has reached the limit of its normal movement in this direction a state of tension arises and, if the force continues, something has to give way. On the inner side the tibia tries to drag the internal semilunar cartilage forwards. But the posterior end of this cartilage is firmly held down by the condyle of the femur and also by its attachment to the internal lateral ligament, so that a great longitudinal strain is thrown on the curved cartilage. A common result of this accident is that the cartilage is torn from its peripheral attachment to the capsule and springs like a bow-string towards the centre of the joint. This is the familiar bucket-handle detachment of the cartilage which is so often found at operations for displaced semilunar cartilage.

The symptoms of torn and displaced semilunar cartilage have been known to surgeons for very many years, and they are described in all text-books of surgery. It is universally recognised that, when a joint is "locked" by the cartilage getting caught between the bones, it must be freed at once by manipulation, for, if it is left, it will do irreparable damage to the joint. It is also known now that the only thing that manipulation can do in such a case is to displace the cartilage further towards the centre of the joint, where it may lie in the intercondylar notch, and with luck may not give trouble for a long time. It is known that a detached cartilage cannot be made to retrace its steps, as has been claimed by some people. And, lastly, it is known that fibrocartilage does not heal, so that even if it could be restored to its original position it would not become re-united. Personally I believe that a displaced cartilage should always be removed, because it nearly always gives rise to further trouble sooner or later, and it is significant that a very large proportion of the cases that are treated by manipulation in the first place come eventually to have their cartilages removed by operation.

But what surgeons failed for so long to grasp was that exactly the same accident which, if it went far enough, would tear the cartilage, might in fact stop short of actual detachment and produce instead a sprain of the peripheral attachment of the cartilage. A sprain is a rupture or tear in a minute or microscopical sense. A few fibres of the ligament are separated or torn; there is a little hæmorrhage around them, followed by exudation of fluid and infiltration by connective tissue cells—in fact, the usual simple inflammatory reaction to an injury, which ends either in complete resolution or in the formation of new fibrous tissue or adhesions at the site of the injury.

In the knee-joint this condition gives rise to a characteristic train of symptoms. There is usually a history of an initial twist of the knee, followed by pain on the inner side and perhaps some synovitis, but never any locking of the joint. The patient complains that the knee is weak, that it tends to give way, and that he then gets twinges of pain on the inner side, and perhaps some swelling. On examination, the knee looks normal; there is often a tender spot on the inner side over the joint cleft; movements appear to be normal, though there may be some pain on outward rotation of the leg; there is also some wasting of the quadriceps.

Now surgeons would not operate upon these cases, because there was no typical locking of the joint suggesting displacement of the semilunar cartilage, and, being unfamiliar with this minor degree of the same injury, they did nothing, except order some ineffective massage. So that the patients went in large numbers to bone-setters, who promptly cured them by manipulation, because these cases respond readily to manipulation of the joint. The bone-setter diagnosed them as cases of "slipped cartilage" and professed to put the cartilage back. Actually they were cases of chronic knee strain with adhesions about the peripheral attachment of the cartilage. But, as they were easily cured by manipulation, the bone-setter got the reputation of being able to cure cartilage cases without operation while the surgeon could only cure them by operation. The manipulation, of course, consists merely in forcibly putting the joint through its full range of movement in all directions, not forgetting rotation of the head of the tibia. The results, as I have said, are entirely satisfactory, the great majority of cases being promptly relieved of their pain. Here again we can improve upon empirical treatment by employing a proper anæsthetic and by ensuring efficient after-treatment.

Pain in the Back

In my experience, after the foot, the spine and the pelvic joints are the parts which most often require manipulation, and the conditions which call for it are among the commonest in general practice. In recent years an enormous volume of literature

has been poured out, chiefly from America, about what Americans have called "low back pain." In my opinion the subject has been needlessly elaborated and a great deal of what has been written is purely imaginary. The cases included in this category fall mostly into four groups: (1) sacro-iliac strain; (2) lumbosacral strain; (3) acute and chronic lumbar back strain; and (4) spinal arthritis, with or without sciatica. In addition to these, of course, we meet with cases of true lumbago, Pott's disease, compression fractures of the lumbar vertebræ, and other less common conditions which are easily distinguished by their characteristic signs.

SACRO-ILIAC STRAIN

Strain of the sacro-iliac joint is the commonest cause of persistent pain in the lower part of the back. The sacro-iliac joint is exceedingly strong and possesses a very small range of normal movement, while the forces acting upon it are very great. If during some sudden or unguarded movement the joint is forced beyond its normal range, it is strained or sprained like any other joint in similar circumstances. Such strains are very common; but that any gross or demonstrable displacement or subluxation of this joint occurs, except in the rarest instances, has never been proved either by clinical or by radiographic examination. Sacro-iliac strain either comes on suddenly with a sharp pain in the joint during some effort or after a fall, or it may seem to come on gradually. Many patients who give a history of gradual onset will, however, recall a strain or an injury when they are questioned about one. It is especially common in women, and not infrequently follows childbirth or gynæcological operations. The patient complains of pain over the back of the sacro-iliac joint, usually worse after sitting and often better when he is walking about. He has a feeling of insecurity which is quite characteristic. When asked to localise the pain, he feels more or less accurately for the posterior superior spine of the ilium, which overlies the centre of the joint, and firm pressure over this point and immediately below it evokes an expression of pain, which is almost enough for a correct diagnosis. In fact, the only serious condition to be excluded is tuberculous disease of the sacro-iliac joint, which is comparatively rare, much more disabling, and seldom presents itself before there is either an abscess or obvious signs of bone destruction in the radiogram If this condition is not recognised and properly treated it may persist for years, and a considerable degree of neurosis is often developed.

The treatment is usually simple and straightforward. The great majority of cases (over 90 per cent.) are cured by manipulation, and occasionally the cure is sudden and dramatic. It is exceptional to find a case that obstinately resists manipulation, though some cases have to be manipulated more than once. The few that are not so cured can be cured by arthrodesis of the joint. The actual manipulation employed is a forcible twist of the pelvis under full anæsthesia, while the patient is turned half over, so that the leg on the affected side hangs over the side of the table. Massage and exercises are commenced on the following day and continued for a month, or as long as may be necessary.

LUMBOSACRAL STRAIN

Lumbosacral strain is quite different from sacro-iliac strain and should not be confused with it, even when, as sometimes happens, the two conditions are combined. As in sacro-iliac strain, there may be a history of injury or of gradual onset, and the latter history is usually associated with faulty posture. When the patient is asked to localise his pain, he draws his fingers horizontally across the back above the base of the sacrum. Tenderness on pressure is definitely localised to the tip of the spinous process of the fifth lumbar vertebra and the space below it. Pain is also felt on hyperextending the spine. There may be some spasm of the erector spinæ muscles, but usually the patient can bend forwards fairly freely, the movement taking place in the lumbar spine above the lumbosacral junction. These signs are quite sufficient for a diagnosis.

Now this condition looks as though it ought to be amenable to manipulation, but in our experience it is not, and the reason, I think, is that the lumbar spine is so movable that it is impossible to localise manipulation accurately to the lumbosacral junction. But it occurred to us that, if we could not stretch the ligaments, we could divide them. We therefore excised the spine of the fifth lumbar vertebra, thereby ensuring that everything attached to it was divided, and in every case in which we have done this the pain has been relieved and has not returned since. This is a minor operation, and I give it to you for what it is worth.

ACUTE AND CHRONIC LUMBAR BACK STRAIN

Acute back strain is another very common condition which presents quite definite clinical features. It is essentially a localised rupture of some of the deeper fibres of the erector spinæ muscle on one side, produced by muscular action. In proof of this is the fact that occasionally, though rarely, one of the transverse processes of a lumbar vertebra is pulled off by the violence of the muscular contraction. Without warning, the patient experiences a sharp pain like a stab in the back, either during some special effort, such as lifting a heavy weight, or while stooping in an awkward position. The sharp pain is succeeded by a dull ache in the back, which is most noticeable when the patient is sitting with the muscles relaxed. Later, the lumbar spine is found to be rigidly fixed by spasm, and every attempt at movement is pulled up by a sharp stab of pain in the back. On examination, the whole of the lower part of the back is found to be hyperæsthetic, and there is a localised point of tenderness over the erector spinæ on one side.

If seen when the condition has become chronic, there is a history of sudden onset, there is a point of localised tenderness over one erector spinæ, the muscle on one or both sides is strongly in spasm, and when the patient tries to bend forward he either does not bend at all or he inclines towards the painful side. Frequently there is a considerable degree of added neurosis, and I do not know of any trivial injury which causes such a profound and disproportionate sense of disability. The radiographic appearances are normal except in the rare instances in which there is a fracture of a transverse process.

The treatment of acute and chronic back strain should be prompt and decisive. It consists in immediate mobilisation of the spine by forcible manipulation under an anæsthetic, followed by massage and exercises. This usually cures the condition outright, unless there is an impending claim for compensation or a long-standing neurosis. The manipulation is practically the same in all cases—namely, forcible flexion, rotation in both directions, and finally hypertension.

SPINAL ARTHRITIS, WITH OR WITHOUT SCIATICA

A patient with spinal arthritis may or may not complain of his back. Many patients with this condition are quite unaware that there is anything wrong

with their spines. They complain of sciatica. The great majority of cases of sciatica are suffering from spinal arthritis, and the pain is due to irritation of the roots of the sciatic nerve in the intervertebral foramina. On examination you will find that the movements of the lumbar spine are restricted and that the pain and tenderness are referred to the sciatic notch and down the trunk of the sciatic nerve. We do not pretend that spinal arthritis is more amenable to treatment than chronic arthritis elsewhere, but we do find that, if we can restore mobility to the lumbar spine, the pain may be relieved, and we have found that manipulation under an anæsthetic followed by physiotherapy may be expected to give relief, almost amounting to a cure, in about 50 per cent. of cases.

MEDICAL SOCIETIES

PADDINGTON MEDICAL SOCIETY

AT a meeting of this society, held at the Great Western Hotel on Oct. 11th, the chair was taken by the President, Dr. G. DE SWIETOCHOWSKI. Mr. A. S. BLUNDELL BANKART read a paper on Manipulative Surgery in General Practice, which is printed on p. 840.

The CHAIRMAN said that Mr. Bankart had thrown a good deal of light on the triumphs of the profession's successful rivals, the bone-setters.

Dr. H. C. WOODYATT asked what should be done for the foot in early convalescence if supports were to be deprecated.—Mr. BANKART replied that the discomfort of the support often discouraged rather than encouraged the use of the foot. Muscular action after illness should first be restored by massage. The only support he ever used was a wedge on the inner side of the heel.

Dr. W. G. BENDLE said he had often been puzzled by the success of bone-setters. Apparently the general practitioner had been too timid to perform manipulations which the bone-setter undertook unhampered by any knowledge of anatomy or pathology. He would like to know how long after injury manipulation should take place.—Mr. BANKART replied that he never rested a sprained joint unless it was too painful to touch. As soon as it could be touched he put a masseuse on to mobilise it. The best pressure for immediate application was a couple of small sponges; this generally brought the swelling down.

Mr. R. Y. PATON pointed out that surgery was the Greek word for manipulation, and had only secondarily become associated with "cutting" instead of "use of the hands." Bone-setters obtained their success because they did something at once, before the patient left the room. It did not matter if trouble recurred; the psychological effect of giving some immediate relief, announced by an audible click, was very great. He knew a man who had to wear supports in his bedroom slippers but could complete the annual Stock Exchange walk without trouble in ordinary shoes. This confirmed Mr. Bankart's theory of flat-foot. The foot, to be healthy, must be supple. He quoted the case of a girl who had twisted her knee and had it put right at once by a bone-setter; later she had put out the other knee, and a doctor had put her to bed and told her she had "water on the knee." After several weeks she had gone to hospital and been cured by the manipulation which she might have had at once. There were many movements not taught in anatomy. Full flexion and extension did not indicate a normal knee; there must also be rotation of the tibia on the femur. Internal rotation of the humerus was a movement of great importance to the patient. In some ankle strains the tibia rode forward a little on the astragalus; if it were pushed firmly it went back with a dramatic crack and the patient was greatly benefited.

After a Colles's fracture there might be much limitation of the smaller wrist movements, causing severe disability. Manipulation would restore them. Early function was of the greatest importance. Mr. Paton said that he was even making patients with Pott's fractures walk three days after operation. Fear was the chief factor in preventing early movement.

Dr. J. COHEN wondered whether the lithotomy position used in gynæcological operations had anything to do with low back pain following them, and whether bands of strapping over the sacro-iliac joint were of value. He quoted a case of persistent pain after fracture of a metatarsal; the patient had tried Scholl supports, but his pain had ceased as soon as his compensation was paid.—Mr. BANKART replied that he had no doubt that the lithotomy position was responsible for sacro-iliac strain. He could not conceive how strapping could have any effect on so deeply situated a joint with tremendous forces acting on it from above.

Dr. ALEX. BALDIE said that general practitioners lacked the clear-cut precision of thought of the specialist. It would have been very useful if the principles they had heard that night had been applied to the thousands of flat feet seen in the war. But if a third of these cases had been cured would not the others have shifted their neurotic symptoms to some other region? It was difficult to determine whether a case of backache was suitable for manipulation, for psychological treatment, or for occupational therapy. Man was a vertical animal for 16 hours out of the 24. Dr. Baldie asked to what extent obscure pains in the back were explicable by these habits of posture, and what was the diagnosis and treatment of this type.—Mr. BANKART said that postural backache was very common, especially in round-shouldered women with prominent abdomens. They had no spot of tenderness in the back. They were treated by remedial exercises or—if very fat—by abdominal supports. Many of them had a definite neurosis superadded, and an indefinite hyperæsthesia over the back. Their neurosis would not, however, be cured without manipulation to relieve its organic basis. Manipulative surgeons had to do a great deal of psychotherapy.

Dr. S. CROWN asked for more details of the patients with rupture of the erector spinæ.—Mr. BANKART replied that he had long hesitated to manipulate acute back strains, but he had seen dramatic cures, and had had very great success himself. The acute pain was largely due to muscular spasm, and the explanation of the relief was that manipulation paralysed this. No trivial injury caused such a profound disability and psychological effect; ignorant and imaginative people feared paralysis. This accounted for the traumatic neurasthenia in back strains, and was another reason for immediate treatment.

Dr. J. GREEN asked if manipulation were practised in rheumatoid arthritis.—Mr. BANKART replied in the

negative. He manipulated osteo-arthritis, he said, often with great benefit.

Dr. N. D. DAMRY related an experience of fracture of the olecranon in India. The doctor had frightened the patient, but the bone-setter had set it, supported it for a few days, and then manipulated the limb, with excellent result. Bone-setters had, he said, led the way in the doctrine of early movement.—Mr. BANKART said that in his experience the last thing a bone-setter in this country would do was to set a bone; if he suspected a fracture he passed the case on at once.

The CHAIRMAN related personal experiences of success following early manipulation. A spot of tenderness often remained just over the back of the joint in wrist sprains. A Colles's fracture often showed persistent pain over the styloid process of the ulna. In the middle of the calf there was often pain after ankle injuries. If these secondary lesions were not attended to early the result would be spoiled. All general practitioners practised manipulation; expression of the placenta was a skilled manipulation. Manipulation for uterine displacement had been recommended a few years ago by a Swedish authority.

REVIEWS AND NOTICES OF BOOKS

Reflex Activity of the Spinal Cord

By R. S. CREED, D. DENNY-BROWN, J. C. ECCLES, E. G. T. LIDDELL, and C. S. SHERRINGTON. Oxford: Clarendon Press. 1932. Pp. 183. 10s.

THE distinguished physiologists who have collaborated in the production of this book have sought to lay before the reader a concise account of what they style the "elementary features" of reflex mechanism, as it can be studied in the reflexes of the mammalian preparation at levels below the corpora quadrigemina. They are, indeed, desirous of restricting the term "reflex" to such phenomena as characterise post-quadrigeminal animals, and in consequence would not allow the term for any automatic activities at higher levels; ex hypothesi there would be no such thing as a cortical reflex. Whether such a distinction should be rigorously maintained is perhaps open to discussion. But be that as it may, the chief object of study in the book is the individual motor-unit, of which much more is known now than was known a short time ago. The individual anterior-horn cell is the "motoneurone"; its axone connects with perhaps as many as 160 separate muscle-fibres, the whole constituting a "motor unit." Interesting evidence is adduced which goes some way towards settling the question of whether neurones are structurally linked or not, the view here taken being that there is contact (by means of the neuronic arborisations known as "boutons terminaux" which are applied against the cytoplasm of the adjacent cell), but not anatomical continuity. There is thus a "surface of separation," to whose varying properties and conditions many of the qualitative differences as between reflex-arc conduction and nerve-trunk conduction are due.

The degree of activity of a given motoneurone depends on the algebraic sum of the opposed influences of excitation and inhibition which converge on it at any given moment; it is the "collision-field" of the two, which are both commonly at work. Such ways of phrasing the facts of experimentation undoubtedly suggest a "conflict" between opposing forces, yet elsewhere the process is described as one of "collaboration." On still another page we read that one influence acts "against" the other, as "more or less a counterpart and counterpoise." There is here surely that "coöperation of antagonism" of which Hughlings Jackson used to speak—an expression that can hardly be bettered. Considerably less is known of the locus of inhibition than of that of excitation; according to work here summarised, it lies "closely circumjacent" to the motoneurone itself.

The application of the manifold researches of the writers of the book to medicine and neurology in particular may appear somewhat remote, but physiology has already aided immensely in the understanding of clinical problems; and the clinician may hopefully peruse such a volume of up-to-date physiology as this with an eye to the interpretation of the symptoms that he encounters.

Anatomie élémentaire des centres nerveux et du sympathique

Second edition. By P. GILIS, Professor of Anatomy at the Faculty of Medicine of Montpellier. Revised by J. EUZIÈRE, Professor of Nervous and Mental Diseases, Montpellier. Paris: Masson et Cie. 1932. Pp. 234. Fr.24.

WE reviewed this book on its first appearance some five years ago. The new edition, of practically the same size, contains but few modifications. Its major portion is concerned with a minute description of the sympathetic nervous system, the form and functions of which are dealt with from the sensory, motor, and secretory side respectively. Though an elementary text-book, it nevertheless gives a fairly extensive account of its subject matter, the usefulness of which is increased by a series of simple schematic drawings—original, clear, and well supplied with explanatory legends.

Some Factors in the Localisation of Disease in the Body

By HAROLD BURROWS, C.B.E., F.R.C.S., Assistant at the Research Institute of the Cancer Hospital; Consultant-Surgeon of the War Memorial Hospital, Gosport. London: Baillière, Tindall and Cox. 1932. Pp. 299. 15s.

THE predilection of certain micro-organisms for particular regions of the body has long been recognised as one of the most interesting problems of the process of infection. In this monograph Mr. Harold Burrows puts forward the thesis that the localisation of many blood-borne diseases is due (1) to an abnormal permeability of the walls of small blood-vessels, (2) to the presence of forces which will transport the noxious agents through the endothelial cytoplasm, (3) to the retention of noxious agents in the tissues under the influence of inflammation. In the first part of his book the influence of the inflammatory process upon the permeability of vascular endothelium is discussed, also the permeation of the capillary endothelium by normal proteins, and the localisation in the tissues of foreign proteins, dyes, natural pigments, syphilis, bacteria, viruses, and cancer. The second part of the book deals with the factors concerned in localisation: the cause of the increased capillary permeation, the transport of matter from the blood stream to the tissues, and the retention of

colloids or other substances by inflamed tissue. The third part consists of a general discussion, and includes a section devoted to the consideration of the process of localisation on therapeutic measures.

Dr. Burrows has read widely. His book contains a wealth of information which will be of value to workers in this subject, and a bibliography of over 400 references is appended. Certain of his conclusions, however, seem to have little application to disease as it occurs in the human being. The numerous examples which he details of the metastatic localisation of various infections are of interest, as illustrations of a process which has long been recognised, but they do not explain the incidence of the primary disease; and in our view the author stretches his argument beyond reasonable limits when he applies his theory to the cancer process. It may be, as he says, that a primary malignant growth is due to the localisation of a circulating cancer virus in an area of inflamed or damaged tissue, but this is merely a hypothesis. Again, it is hardly correct to say that several malignant tumours in animals are initiated by viruses; nor will most pathologists agree that malignant metastases are due to the arrest of malignant emboli by the macrophage cells of the reticulo-endothelial sinusoids. One of the most pleasant features of the book is the series of coloured plates illustrating the localisation of pigments in the lesions produced in animals. These are beautifully reproduced, and indicate the valuable possibilities of intravital staining.

Clinical Atlas of Blood Diseases

Second edition. By A. PINEY, M.D., M.R.C.P., Director of Pathological Department, Cancer Hospital, London; and STANLEY WYARD, M.D., M.R.C.P., Physician to the Hospital. London: J. and A. Churchill. 1932. Pp. 105. 12*s.* 6*d.*

THE new edition of this atlas is in every way a worthy successor to its predecessor. The colour plates are among the best of their kind ever published and reflect the greatest credit on the artist, Mr. J. R. Ford, and on the printers. The letterpress accompanying the plates is apt and concise; the microcytic anæmia associated with absent or deficient hydrochloric acid in the gastric juice which has been described in this country by L. J. Witts and is probably the commonest of all types of anæmia in the British Isles escapes specific mention, but most of the common conditions are well described, while every possible hæmatological rarity receives attention.

An Introduction to Sexual Hygiene

By A. BUSCHKE, M.D., and F. JACOBSOHN, M.D. Translated by EDEN and CEDAR PAUL. London: George Routledge and Sons, Ltd. 1932. Pp. 193. 7*s.* 6*d.*

THIS book is a good example of a literature that is becoming profuse; it is, however, a translation from the German and there may be more need for it in the country of its origin than there would seem to be here. The structure and function of the reproductive organs of both sexes are clearly set out, some elementary considerations in respect of reproduction will be useful to lay readers, and the essays upon the problems of puberty and the sexual impulse are well devoid of fine writing and quite sane in their teaching. Facts that are disagreeable, some of which were till recently not accepted as facts, are faced, and the reasons for the conclusions upon debatable points are given. The advantages of birth control are taken for granted and some elementary information is supplied concerning certain techniques. Monogamy is regarded as the ideal form of marriage both for men and for women, and all forms of "modified marriage" are condemned. But a quasi approval of "companionate" unions, as a substitute for the early marriage that is so difficult in modern conditions, must be dependent upon the successful practice of birth control.

New Babes for Old

By WINIFRED DE KOK, M.R.C.S., L.R.C.P. London: Victor Gollancz. 1932. Pp. 191. 5*s.*

THIS book, which is intended for parents, contains an account of the development of infants and small children, and advice on their management and upbringing. It is written from the psycho-analytic point of view, and is illustrated throughout by notes of the progress and achievements of the author's children. Much stress is laid on the importance of weaning, in the happy management of which the seeds of all future conduct are held to lie. Much of the advice in this book will probably be found to work well with many children, but there is little recognition of the diverse ways in which different children respond to the same mode of upbringing. In some cases the author's optimism may lead to disappointment on the part of parents who adopt her recommendations, some of which are rather difficult to apply to existing social conditions.

A Manual of Pharmacology

Fourth edition. By TORALD SOLLMANN, M.D., Professor of Pharmacology and Materia Medica in the School of Medicine of Western Reserve University, Cleveland. London: W. B. Saunders Co., Ltd. 1932. Pp. 1237. 37*s.* 6*d.*

THIS important work has been revised and reprinted on ten occasions since it was first published in 1917. Prof. Sollmann's chief object has been to furnish medical students and practitioners with an outline of the current conception of the actions of drugs, especially from the point of view of their practical importance in medicine, and in this he has succeeded admirably. The book is, however, much more than a mere outline. By relegating to small print parts which the author does not regard as having a direct bearing on medical practice, he has been able to present a mass of information on all aspects of pharmacology, and has, in fact, made his book the best work of reference on the subject in the English language. He has added also an extensive bibliography which should be of great help to the practitioner and investigator who may desire to form an independent judgment or to obtain additional information. In the new edition many of the sections have been rewritten, the most important being those on the barbiturates, sexual hormones, arsphenamine compound, temperature regulation, vitamins, and the iodine compounds employed in roentgenography.

The book can be cordially recommended to everyone who desires an accurate and up-to-date work of reference on pharmacology.

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THE LANCET

LONDON: SATURDAY, OCTOBER 15, 1932

PROFESSIONAL SECRECY

AT the St. Pancras inquest, reported in another column, a medical practitioner was found to have taken the unusual step of cutting off and destroying the upper parts of the pages of his case-book sooner than permit the police the possible investigation of his patients' secrets. The privilege, it must be remembered, is the privilege of the patient not of the doctor. The moral obligation of professional secrecy is well established. There is undoubtedly a legal obligation as well. Some years ago, when the Court of Appeal was examining the banker's duty not to disclose his customer's account, Lord Justice SCRUTTON, in declaring that secrecy was an implied term of the contract between banker and customer, suggested that the same term would be implied between doctor and patient. In other words, a doctor is liable to an action for damages if he wrongfully discloses his patient's confidences. Lord RIDDELL, in his little volume on "Medico-Legal Problems," remarked that the absence of copious direct legal decision on this point must be due to the consistently discreet and uncommunicative behaviour of the medical profession. It is well known that no cause of action can arise in respect of anything said by a witness in a court of law. Nor is there any doubt that the law insists on a doctor answering in court all such questions as the interests of justice may require to be put to him. Refusal to answer exposes him to the serious and summary penalties inflicted for contempt of court. It is not quite clear to what further lengths legal insistence will go. The doctor must give information to the judge in court: need he give it to the policeman outside? Is he obliged to set the criminal law in motion?

A simple and possibly not uncommon example of the dilemma occurs where a doctor is called in to attend a woman upon whom an illegal operation has, as it seems to him, been performed. What is he to do? In 1896 Mr. Justice HAWKINS told a grand jury that he very much doubted whether, in such a case, the doctor could be justified in reporting the facts to the Public Prosecutor: "such action would be a monstrous cruelty." The Royal College of Physicians of London thereupon took the opinion of the late Sir EDWARD CLARKE and Mr. HORACE AVORY (now the distinguished High Court judge) who confirmed HAWKINS'S opinion. A medical man, they advised, was not liable to be indicted for the practically obsolete offence of misprision of felony, merely because he does not inform the police in a case where he suspects criminal abortion. Misprision of felony, it may be explained, is the offence of concealing (or procuring the concealment of) a felony when one knows that some other person has committed a felony. In December, 1914, Mr. Justice AVORY reopened the matter by enlarging, as it seemed, the medical practitioner's responsibility. A woman who died as the result of an illegal operation had been attended by three doctors. She was understood to have mentioned to one or more of these the name of the abortionist. But, because none of the doctors passed on the information to the police, no dying statement was taken, and there was insufficient evidence for convicting the person accused in the case. The learned judge, while conceding the general duty of medical secrecy, told the grand jury that this was an instance where the desire to preserve the confidential relation should have been subordinated to the good citizen's duty to assist in the investigation of serious crime. Expressing the wish to clear up all misunderstanding or misrepresentation as to the opinion he had given 20 years earlier, Mr. Justice AVORY declared that it might be the moral duty of the medical man, even in cases where the patient is not dying or not unlikely to recover, to communicate with the authorities when he sees good reason to believe that a criminal offence has been committed.

> "However that may be, I cannot doubt that in such a case as the present, where the woman is, in the opinion of the medical man, likely to die, and therefore her evidence likely to be lost, it is his duty; some one of these gentlemen ought to have done it in this case."

It is noteworthy that the words "moral duty" rather than "legal duty" were used. One might also perhaps classify judicial colloquy with a grand jury as something less conclusive and authoritative than a decision of the Court of Criminal Appeal. Not unnaturally, the observations uttered at Birmingham took the medical profession by surprise. Amongst other bodies which examined the legal position more closely in consequence, the Royal College of Physicians of London obtained from the censors' board a report containing medical and legal opinions. This report was adopted by the College in July, 1915, and was circulated to the Public Prosecutor, the Royal College of Surgeons, the General Medical Council, and the medical press. The Public Prosecutor taking exception to some of the legal advice, the terms of the report were varied. Finally, resolutions of the College were published in February, 1916, after obtaining the opinion of counsel (the late Sir RICHARD MUIR). Counsel's opinion was mainly devoted to the admissibility in evidence of dying statements, and the method of recording such statements. The resolutions first sum up what the College believes to be the proper professional practice. That is to say, they reaffirm the solemn duty to respect a patient's confidence. They state that the doctor who is convinced that a third person has performed an illegal operation should urge his patient, especially if she is likely to die, to make a statement which may be available against the abortionist, provided always that the effort of persuading the patient does not prejudice her prospect of recovery. They state that the College

is advised that, if the patient refuses to make the statement, the doctor is not legally obliged to pursue the matter further. They observe that, if the patient dies, the doctor should refuse to give a certificate of the cause of death, and should communicate with the coroner. This last observation will now, of course, be read in conjunction with the 1926 legislation and the consolidated Regulations of 1927 as to death registration; under Part IX. of the latter the registrar reports to the coroner any death which appears, from the contents of the medical certificate, to have been due to abortion. The resolutions of 1916 went on to emphasise the legal position by declaring that the doctor is under no legal obligation either to urge the patient to make a statement, or, if she refuses to do so, to take any further action. It is significant that this statement of the legal position was submitted to the Director of Public Prosecutions before publication, and is understood to have had his complete approval.

If the resolutions of 1916 are taken to represent organised medical opinion, independent medical writers have expressed their own hesitations. Although it is no part of a doctor's duty to act as an auxiliary policeman, is it any part of his duty to screen a professional abortionist? Lord RIDDELL, admirably summing up the problem in the volume already cited, remarks that the practice of abortion has greatly increased since the resolutions were passed. He asks whether, apart from legal obligation, the medical profession is justified in helping to conceal acts of this nature especially where the case is one of a series performed by the same abortionist. The answer seems to depend on the strength of public opinion, whereon ultimately the law itself and its enforcement are founded. Since Lord RIDDELL'S book was published in 1929, judicial utterances have shown that the law itself is uncertain. What obligation can there be upon the doctor to aid in bringing an abortionist to justice if the judge holds that a charge of criminal abortion is an obsolete anachronism? If some of our judges think this and others think the opposite, the legal consequences of medical secrecy are a mere gamble.

JUVENILE TUBERCULOSIS: A SCOTTISH INVESTIGATION

THE gaps in our knowledge of tuberculosis in childhood are gradually being filled up as diagnosis becomes more accurate. Clearer knowledge is leading to more precision in defining our terms. L. COBBETT has pointed out, for instance, how the old phrase tabes mesenterica, which used to figure so largely in practitioners' death certificates, has declined in frequency during recent years, doubtless in favour of a more accurate terminology. A monograph published this week [1] goes a long way toward closing the gaps still further. Dr. BLACKLOCK has made full use of his opportunities as pathologist to the Glasgow Royal Hospital for Sick Children in an exhaustive study of the tuberculous lesions, obvious or suspected, in a series of 1800 consecutive autopsies at the hospital during the years 1924–31. He has thus made it possible to collate the figures for Glasgow and the West of Scotland with those previously obtained for Edinburgh and the East, and afforded a basis for checking the figures already available from America, England, and Germany. Dr. BLACKLOCK'S work helps, too, to define the differences between tuberculosis of childhood and tuberculosis of the adult. And last, but by no means least, the details of his post-mortem records provide material, extremely valuable to comparative pathologists, for comparison with the data set out [2] by Dr. H. H. SCOTT as a result of observations on the children of non-immunised Chinese at Hong-Kong and of higher apes in the London Zoo.

After determining the bacteriological type of the tubercle bacilli isolated from cases at autopsy—both those dead of tuberculosis and those dead of other causes—and from cases of surgical tuberculosis still alive, Dr. BLACKLOCK concludes that 37 per cent. of the bacilli are of the bovine strain, a finding which leads him to the conclusion that bovine tuberculosis is more prevalent in Scotland than in England or on the continent. Out of the total number of 1800 cases investigated post mortem, 283 showed tuberculous lesions, and in these 173 (61·1 per cent.) were considered to be due to a primary infection of the thoracic tissues. Wherever this primary lung lesion was found, only bacilli of the human type were obtained, whereas there was a high incidence of bovine strains in primary abdominal lesions. The high preponderance of bovine strains in abdominal lesions will excite no surprise, but the total absence of bovine strains from the thoracic lesions in the Glasgow autopsies is of considerable interest in view of the recent figures—chiefly in young adults—given [3] by W. T. MUNRO at Fife and Kinross Sanatorium in the East of Scotland. Of 28 cases of cervical adenitis, 10 yielded human and 18 bovine strains, a percentage of bovine origin lower than that found in most other investigations of Scottish children, but again higher than English and continental figures. A similar result was obtained with bone and joint tuberculosis, affording strong evidence that in Scottish children there is a special prevalence of bovine infection. In his large experience of autopsies upon adults in Glasgow, Dr. BLACKLOCK has rarely found evidence of healed infantile damage, and this fact leads him to the conclusion, contrary to the views expressed in other parts of the world, that it is exceptional for a dormant infection received in childhood to flare up later. But he also finds that pulmonary tuberculosis in young children in the West of Scotland is nearly always fatal—as indeed it is reputed to be elsewhere. Is it not possible, therefore, that there are but few survivors to break down in adult life? Dr. BLACKLOCK finds it difficult to explain

[1] Tuberculous Disease in Children: its Pathology and Bacteriology. By John W. S. Blacklock. Medical Research Council, Special Report Series No. 172. London: H.M. Stationery Office. Pp. 155 + 23 plates. 3s.

[2] See THE LANCET, 1930, ii., 1249.

[3] Edin. Med. Jour., 1930, xxxvii., 141.

this greater mortality from tuberculosis of the lungs or tracheo-bronchial glands in Scottish children in contrast with those in other parts of the world. "It may be," he writes, "that, on account of the relatively isolated position of this country as compared with others, the opportunities for infection in the past . . . have prevented the development of the same racial resistance in Scottish people as in those of other countries."

A noteworthy feature of Dr. BLACKLOCK's investigation is the light which he throws on the pathway of infection to the lung and lymphatic glands. A characteristic primary lung lesion was described originally by PARROT (1876), KUSS (1898), and later by GHON, CANTI, and others, as occurring in the human subject and corresponding to the primary site of infection. This lesion was found by Dr. BLACKLOCK in 148 out of 173 cases in which the first site of infection was considered to be thoracic. Of the cases with primary foci, 133 had one each, and in 15 they were multiple, giving a total of 170 primary lung lesions. All of them showed evidence of caseation; in some further changes—cavitation, fibrosis, or calcification—had occurred. These primary lesions were found more often in the right lung than in the left, the right upper lobe being most frequently involved, and then in order, the right lower, the left upper, the left lower, and lastly the right middle lobe. The anterior aspect of the upper and middle lobes was most frequently affected, the apex of the upper lobes, however, was seldom the site of a lesion. In both lower lobes the primary foci were most frequently found in the lower two-thirds posteriorly. The tracheo-bronchial glands in direct anatomical relation to these foci were always diseased, and the important fact emerged that the occurrence of the primary lesion in any particular lobe was the important factor in determining the distribution of the glandular lesions. Macroscopic and microscopic examinations indicated that the lesions in the primary focus and related lymph glands were either of the same age or else that in the glands was more recent. No retrograde spread from the tuberculous tracheo-bronchial glands back into the lung substance was observed. In some of the cases there was spread of the tuberculous adenitis to the glands in the neck, or to the lymph glands in the upper part of the abdomen, but this was always secondary to that at the root of the lungs, and the intensity of the adenitis diminished the further away it was traced from the glands in direct anatomical relation to the focus in the substance of the lung. Concerning the significance of these primary foci, the pathological and histological evidence cited renders it unlikely that they are of hæmatogenous or lymphogenous origin. Dr. BLACKLOCK concludes that they are ærogenic, and adds that unknown factors must determine the predominant localisation to a single primary focus. From cases in which the primary lung lesion was found, only human types of bacilli were obtained, either from the lesion itself or from the glands in direct anatomical relation. If the focus had been of hæmatogenous origin, bovine bacilli should frequently have been found, in view of the fact that bovine strains were isolated from 81·8 per cent. of the primary abdominal lesions in children from the same series of autopsies as those with primary thoracic lesions.

Tuberculosis in the child is an obscure and controversial subject. Dr. BLACKLOCK's report contains a great wealth of material, skilfully handled. It should do good service in letting light into many dark places, and his pathological and bacteriological evidence should be reflected in more reasoned clinical treatment and the medical administration of juvenile tuberculosis.

FIFTY MILLION BOTTLES OF MEDICINE

THE Ministry of Health tells us that last year over 50 million prescriptions were dispensed for 15 million insured persons, and that of these prescriptions over 60 per cent. were for mixtures. Yet, as Dr. E. KAYE LE FLEMING so pointedly emphasised in his inaugural address to St. George's students, abstracted in our last issue (p. 801), the art of prescribing is not a strong point in the general practitioner's training; much more instruction, he thinks, might well be given in the medical curriculum on this subject. Dr. LE FLEMING went on to deprecate the use of the phrase "the bottle of medicine fetish"; this gibe, he said, comes more often than not from a critic with no personal knowledge of prescribing, and who is as ignorant of the real therapeutic value of drugs as of the psychology of human nature; the best answer to criticism of this kind would be found in the issue of the new Pharmacopœia. He went on to deal with the old fallacy, which dies so hard, that a panel patient is debarred from having the same range and quality of drugs as the private patient, and that an insurance doctor who prescribes the best for his patients will be admonished and surcharged. The panel patient, he said with emphasis, may have anything necessary for his proper treatment; but it is unfortunately true, he added, that the medical student has little opportunity for acquiring a knowledge of the values of remedies before he engages in practice, and it is as easy to be extravagant in prescribing as it is in eating or drinking. Nevertheless, out of 14,840 doctors issuing prescriptions last year under the National Health Insurance Acts, only four were surcharged for excessive prescribing.

In his presidential address to the West London Medico-Chirurgical Society last week, the sub-title of which we have taken for this article, Dr. JULIUS BURNFORD made a comprehensive survey of therapeutics, past and present. Consider, he said, how man must have suffered since he began to take notice of his ills and to trust to others for relief. Consider how through the ages he has been physicked; what an experiment in tolerance! And he went on to cite all the various sources from which medicine in the ages had drawn its stock of drugs and remedies. Treatment had followed treatment in endless stream and variety, though, as if to remind us that there is nothing new under the sun, old treatments were apt to reappear in

new guises; nevertheless, with each revival there comes a more scientific rationalism. He dwelt on the inherent difficulty in judging of the effect of remedies; how tolerance on the one hand, and the tendency to recover without treatment on the other, combined to render difficult and uncertain the assessment of any line of therapy. Nor is the living organism comparable with the machine in the accuracy of its working; rational therapy has always to contend with the many variants of the living organism. Of the final efficacy of treatment he regarded the patient as the best judge; in so far as the doctor retained the trust of his patient, he must have attained to some success. The patient, it is true, had much faith in the bottle; but in the main, he thought, we had passed the borders of empiricism. The discovery of opium, for instance, was empirical, and, as we are still ignorant of its action, empirical it remains. The same was no longer true of cinchona bark, for the advances of protozoology and the discovery of the active parasite and its life-history had led to a determination of the exact lethal activity of quinine. But even now we did not know whether EHRLICH'S "606" acted directly on the spirochæte or indirectly through a tissue reaction. Sometimes enthusiasm for a new line of treatment may have led to a forgetfulness of the fact that the whole individual is disordered in a disease. In an otherwise fertile era of post-mortem study of disease advance was held back by focusing attention on end-results; living pathology had carried us a stage further in the recognition of early processes and the searching out of ætiological principles. But our modern therapeutics might at times be doing injustice by not incorporating the experience of the past. At this stage Dr. BURNFORD surveyed briefly the whole field of modern treatment, concluding with a salutary consideration of its failures. Our therapeutic armamentarium may now be great; how much of it will stand for all time? We are acting according to our lights, and hence rationally by that same view; but let us in all humility remember that the witch or the priest chanting incantations acted just as rationally in the light of their own day.

ANNOTATIONS

TAXATION OF COD-LIVER OIL

A LEADING newspaper last Sunday, in dismissing opposition to the Ottawa agreements, remarked that even the dissenting Liberals cannot be exactly stirred to the depths by the reflection that their cod-liver oil will cost them more. The medical profession is hardly likely to share this light-hearted view of the proposed duties. Year by year it is made clearer that the diet of the poorer classes—if not the richer—is not the "balanced diet" advised by the text-books. Report after report, on rickets, dental caries, maternal mortality, or infectious disease, emphasises the importance of plenty of fresh foods or (if these are too expensive) of cod-liver oil, during infancy, childhood, pregnancy, or convalescence. In cod-liver oil we have a cheap and plentiful source of vitamins A and D; its more general use might go a very long way towards supplying the dietary deficiencies by which industrialism and poverty damage the national health. The taxation of bread would cause little perturbation among dietitians, for under present circumstances even the poorest people would still obtain it through work or charity. It is otherwise with the protective foods—milk, butter, eggs, fruit, and vegetables—which are the first to be sacrificed in time of hardship. It is at such times that cod-liver oil is most required to counteract the evils of an excessively cereal diet; and if steps could be taken to increase, perhaps tenfold, the consumption of cod-liver oil by children and young persons, something definite would have been done to counteract the effects of the present depression. It is the fear of an opposite tendency that causes us anxiety. Arguments about the actual result of the proposed tariff are complex, and the suggestion is repeatedly made that even a 50 per cent. duty could easily be borne by the middlemen and distributors who at present absorb most of the proceeds of sale. Into this economic and commercial argument we do not propose to enter. But we say emphatically that any measures which did in fact reduce the sale of cod-liver oil in this country would be contrary to the public good.

PREVENTION OF HÆMORRHAGE IN THE NEW-BORN

THOUGH mortality in the first two years of life has been greatly reduced during the present century the proportion of infants dying before the tenth day is still very considerable. And this remains true of countries where sepsis and infantile tetanus can be held responsible for very few of the neonatal deaths. Analysis of the available pathological material in many series of autopsies on new-born babies has indicated intracranial hæmorrhage as a common cause of death. Thus B. Fisher [1] noted hæmorrhages visible to the naked eye in 65 per cent. of the brains of 500 infants, and a similar finding was reported in our columns by J. N. Cruickshank [2] in 200 examinations. When it is considered that for every fatal case of intracranial hæmorrhage there are probably many cases of minor hæmorrhage which may or may not cause permanent damage to the nervous system, the importance and frequency of the condition may be realised. R. J. Hefferman [3] has estimated its incidence as high as even 20 per cent. in all new-born babies. The cause of the hæmorrhage appears, as a rule, to be intrinsic rather than extrinsic. It is true that in a certain number there will be found gross damage to the intracranial tissues (such as a tear of the falx cerebri or the tentorium cerebelli), and that death has followed a difficult labour or faulty obstetrics; such fatalities can only be eliminated by improved obstetric technique. There remain, however, the great number of cases where delivery has been easy and the labour in every way normal. In these hæmorrhage appears to be due to the innate tendency of the new-born infant to bleed. It is by no means clear which elements of the blood or vascular system are responsible, since it is found that either bleeding-time or coagulation-time, or both, have a tendency to be prolonged in the new-born infant, whilst even in true hæmorrhagic disease of the new-born the findings are not constant. It is, however, certain that the

[1] Schweiz. med. Woch., 1924, liv., 905.
[2] THE LANCET, 1923, i., 836.
[3] New Eng. Jour. Med., August 18th, p. 293.

hæmorrhagic tendency can be counteracted by transfusion or injection of normal blood. This has been the method of treatment of hæmorrhagic disease of the new-born for many years, and it is extremely rare to find a case that does not respond rapidly to one or more injections. Heffernan [3] has for the past four years given prophylactic injections of maternal blood routinely to every baby immediately after delivery, and reports a series of 800 cases. These include normal, low and high forceps, and breech deliveries, and 68 cases of Cæsarean section. Of the mothers 148 suffered from toxæmia; and there were 46 premature births. No case of hæmorrhagic disease occurred, and the mortality-rate during the first ten days was 2·5 per cent., or 1 per cent. excluding those born before the seventh month. Four infants developed symptoms indicating intracranial hæmorrhage and subsequently recovered. In carrying out the treatment 20 c.cm. of blood was taken from the antecubital vein of the mother and injected into the loose areolar tissue of the infant's infrascapular regions, 10 c.cm. on either side. No suppuration or anaphylactic reactions were observed, and the blood was absorbed in 24 to 36 hours. While the number of cases treated is not large enough to prove the value of prophylactic injection as a routine, the low incidence of hæmorrhage of any severity in the series is striking. The procedure is apparently harmless, and might well be adopted at least in those cases where there are any factors predisposing to hæmorrhage, especially prematurity, maternal toxæmia, or prolonged or difficult delivery.

ELECTRO-COAGULATION OF THE TONSILS

THE destruction of the tonsils by diathermy is the subject of an important contribution by Mr. R. Graham Brown,[1] of Brisbane. In his view, more or less satisfactory results are being obtained by those experts in throat surgery who are endowed with the requisite dexterity and who have a knowledge of the diathermy current. But he deplores the fact that many practitioners throughout Australia have been persuaded to buy diathermy apparatus in the belief that the difficulties they had experienced in the surgical treatment of diseased tonsils would be eliminated, and that a few simple coagulations with a diathermy needle would be effective. Far from this being true, Mr. Graham Brown holds that it is even more difficult to treat tonsils by surgical diathermy than by dissection. He quotes the following among the incorrect statements which are made by interested parties: that the tonsils can be completely removed without inconvenience or loss of time to the patient in three, four, or five sittings; that the coagulation and its after-effects are painless; that, although portions of the tonsil may remain after treatment, these portions are sterile; that the remains (which apparently are tonsillar) are generally nothing more than granulation tissue; that coagulation by diathermy does not lead to "bottling up" of the crypts. Mr. Graham Brown relates in detail a series of seven cases, previously treated by diathermy coagulation, which exemplified certain types of focal infection, and subsequently had to be surgically enucleated. These cases demonstrated the inaccuracy of the statements quoted above; several afford striking instances of increased toxæmia resulting from the bottling-up of septic material beneath the diathermy scar. Mr. Graham Brown is satisfied that total removal can be performed almost painlessly, and with practically no subsequent discomfort, provided that little destruction is done at each sitting, and that a degree of patience is exercised which is seldom found in patients and still less in surgeons. But he is emphatic in his opinion that, especially in the small buried type of tonsil, no treatment short of complete removal should be advocated for fear of greatly increasing the septic absorption from these structures. He has performed a useful service in making it clear that the method is a difficult one, which requires special skill, and often a very prolonged course of treatment, and that it is far from being an easy short cut to the desired end of complete extirpation of the septic tonsil.

[1] Med. Jour. Australia, July 2nd, p. 1.

AMAUROTIC FAMILY IDIOCY

A REPRINT has reached us of a long article on the juvenile variety of amaurotic family idiocy published last year by Dr. Torsten Sjögren.[1] It constitutes a valuable addition to knowledge in respect of a rare nervous disease which seems to occur with greater frequency in Sweden than elsewhere. Dr. Sjögren describes as many as 39 personally observed cases—in all probability more than any other worker has ever seen; and with this rich material at his disposal he is able to supply a clinical analysis that has never been approached. We are given detailed tables relating to inheritance, time and mode of onset, and other clinical peculiarities; the material is handled also from the viewpoint of familial and geographical distribution, ætiology, and pathogenesis. Its pathology did not come within the scope of this research. As a result of his investigations Dr. Sjögren concludes that the disease is distinguished by a more or less regular clinical syndrome and evolution; attention is directed particularly to the changes in the fundi, the epileptic fits, and extrapyramidal symptoms, such as hypertonus and other defects of motility. From a Mendelian point of view the condition seems to have the characters of a recessive; in this respect its heredofamilial features differ from those of the infantile variety. Other questions of interest are discussed in the monograph, which contains a full bibliography and is well documented.

AN INDEX TO PROGRESS IN SEVERE INFECTIONS

THE value of the sedimentation rate of the red cells in enabling the course of pulmonary tuberculosis to be followed and the response to treatment to be gauged has long been recognised; recently Dr. W. W. Payne drew attention [2] to its use in determining the latency or activity of rheumatic infection in children; but in this country, at any rate, it has hitherto played little part in general clinical medicine. Dr. J. W. Cutler,[3] of the Henry Phipps Institute of the University of Pennsylvania, as the outcome of a long series of observations, concludes that this procedure is capable of affording much more help than has hitherto been recognised. The nature of the phenomenon remains a mystery, but Dr. Cutler regards it as proven that an increase in the rate is associated with any condition in which there is increased tissue breakdown, and that the rate affords a correct indication of the degree of this breakdown. The test could thus give no help in the diagnosis of any particular morbid condition, but is capable of affording an index to progress more

[1] Hereditas, 1931, xiv.
[2] THE LANCET, 1932, i., 74.
[3] Amer. Jour. Med. Sci., 1932, clxxxiii., 643.

accurate than any hitherto available. Dr. Cutler uses a type of sedimentation tube devised by himself, which holds 1 c.cm. of blood and is graduated into 50 divisions of 1 mm., each corresponding to 0·02 c.cm. of blood. Readings are taken over an hour at intervals of five minutes. Four distinct types of graph are recognised: an almost horizontal line, a diagonal line, a diagonal curve, and a curve approximating to the vertical; the first alone is normal; the remaining three indicate increasing degrees of intensity in the morbid condition. Dr. Cutler finds that the sedimentation rate is increased in all chronic and acute infections, in local suppuration, in acute intoxications, and in certain endocrine disorders, such as thyrotoxicosis. It is only slightly influenced by simple catarrhal inflammations, and not at all by functional or mental disorder, allergic conditions, simple neoplasms, or chronic valvular disease of the heart. While the test may have some value in establishing a differential diagnosis, particularly where a neurosis is suspected, its principal value lies in the aid which it affords in following progress. Dr. Cutler cites several examples of malignant disease and of pulmonary tuberculosis in which the sedimentation rate by indicating progress of the disorder appeared to belie the clinical course; in every case, the evidence of the test proved in the long run to be correct. The only physiological condition associated with increase of the rate is pregnancy, in which there is a steady increase from the second month on to parturition.

SPINAL ANALGESIA: THE CAUSES OF DANGER

MUCH controversy has raged round the question of how the fall in blood pressure and the respiratory depression which sometimes dangerously complicates endothecal injection of anæsthetics are brought about. Perhaps the most commonly accepted view has been that paralysis of many vasoconstrictor fibres led to splanchnic dilatation and "pooling" and that the drop in blood pressure was due to this and that respiratory depression followed secondarily. The matter has been experimentally investigated recently by researches carried out in the University of Wisconsin [1] to study the relationship between oxygenation of tissues and the maintenance of good cardiovascular function during spinal analgesia. The authors start with the thesis that three mechanisms may be involved in the respiratory paralysis which they regard as the usual cause of death on the table from spinal anæsthesia. These are: (1) Direct action on the respiratory centre by diffusion of the drug to the fourth ventricle in paralytic concentration. (2) Ascending block of the intercostal and phrenic nerves. These two may be arrested by proper dosage and technique. (3) Insufficient nutrient flow of blood through the central respiratory mechanism secondary to cardiovascular depression. This depression, they say, is attendant on every intradural block involving the upper part of the abdomen and thorax. As the integrity of the respiratory centre depends on an adequate volume of sufficiently oxygenated blood the depression is responsible for most cases of respiratory failure. Experiments on dogs do not substantiate the view that paralysis of the splanchnic nerves with subsequent pooling of blood in the abdominal region are the principal if not the only factor involved in the circulatory depression. Loss of skeletal muscle-tone, which accompanies any intradural block, removes an element essential for the maintenance of a stable capillary and venous bed. The authors hold that it matters little practically whether paralysis of splanchnic nerves, or of vasoconstrictors to the skin and to other vessels of the trunk and extremities, or loss of skeletal muscle-tone is the principal factor. The important fact is that a marked decrease in peripheral resistance to blood flow occurs in the region involved in the block. Grave cardiovascular changes occur only in blocks that involve the chest. Two important factors must be considered: additional paralysis of vasoconstrictor fibres and intercostal nerve paralysis. The integrity of the medullary centre and heart is dependent on adequate supply of oxygen. The additional anoxæmia accompanying partial or complete thoracic paralysis may be disastrous. The main contention of their thesis is that the oxygen needs of the body are not adequately met, owing to a reduced volume flow of blood and a decreased gaseous exchange in the lungs proportional to the lowered thoracic excursion. Experimentally the efficiency of respiration, thoracic excursion, and minute volume exchange decreased in blocks involving the thoracic region and the decrease is proportional to the height of the block. Compensation by increased diaphragmatic activity may occur in the low thoracic blocks. This reactivity of the diaphragm is hindered in the Trendelenburg position. Studies of the alveolar and blood oxygen and carbon dioxide both in man and dogs gave the authors further evidence of the decrease of pulmonary ventilation in blocks involving the thorax. They drew the practical conclusions that to combat cardiovascular collapse there should be judicious use of inhalation of oxygen throughout the surgical procedure, prophylactic administration of ephedrine, a moderate Trendelenburg position, and administration of fluid while blood-vessels and heart still maintain their physiological integrity. Artificial respiration with undiluted oxygen is to be practised when there is impending circulatory or respiratory failure and post-operative hyperventilation of the lungs with carbon dioxide periodically throughout the first 24 hours after operation.

[1] From the departments of pharmacology and anæsthesia of the University. Jour. Amer. Med. Assoc., Sept. 17th, p. 961.

STUDIES IN PINK DISEASE

THE story is told of a French physician, visiting a well-known children's hospital in London, who asked an English colleague, after a case of "erythrœdema polyneuritica" had been demonstrated, "qui est ce monsieur Pink?" It is not only in France that the name of pink disease is unfamiliar, but fortunately its characteristics are now more widely recognised, and detailed studies of the condition are being made at various centres. Prof. Cornelia de Lange,[1] of Amsterdam, for instance, has lately described an investigation of the central nervous system from a patient whose brain and spinal cord were sent her by Dr. J. C. Spence of Newcastle-on-Tyne. Briefly, the findings in this case were a slight increase of neuroglial tissue in certain parts of the brain, in areas this being collected together into small "glial nodes." There was nowhere any evidence of change in the neuronic elements and no sign of any inflammation except for a small localised area of meningitis over the left frontal area, only discovered on careful microscopical research. No changes were found in the spinal cord, and in the brain the principal areas showing this increase of glial tissue were the tubero-infundibular region (where the glial nodes were

[1] Jahrb. f. Kinderheilk, August, 1932, p. 193.

most marked), the basal ganglia, optic thalamus, and dentate nucleus. Prof. de Lange's studies have been very exactly carried out and, in particular, so that no confusion should arise, attention has been directed to the appearances of the various areas of the brain in normal infants. In this way it is possible to assert that much of the existing work of the histology of the nervous system in pink disease is unsatisfactory, and the present findings are in accord with the careful studies of W. G. Wyllie and R. Stern and of D. Paterson and J. G. Greenfield in this country in which a small-celled infiltration, believed to be of glial origin, was reported. The patient, in this instance, was a boy nearly a year old, and death was sudden, associated with an alarming acceleration of the pulse. This increased frequency of the pulse, especially in fatal cases, is a feature of pink disease requiring further elucidation. Changes have been described in the vagus nerve and Dr. Gertrud Steinbach [2] describes a case in an older child where electrocardiographic records were made. The patient was a boy over six years old, who presented a fairly typical picture of pink disease with photophobia, nasal catarrh, apathy, lassitude, severe sweating, loss of weight, and the characteristic appearances of the hands and feet. The pulse-rate varied between 160 and 180 per minute, keeping just as rapid during sleep. An electrocardiogram made at this time showed undoubted evidence of myocardial damage. In all three leads the R S T complex was altered considerably. Indeed, the form of the S-wave is believed to be unique, while the T-wave was inverted in leads I. and II. Four months after the beginning of the illness there was definite improvement in the general condition, the pulse was less than 100, while the electrocardiographic changes showed only a slight return towards normality, and changes of a pathological nature still appeared to be present. Since the prognosis is usually good in pink disease, save for the cardiac complication, these studies are of interest and suggest further investigation, perhaps in other centres.

IS FATAL HEART DISEASE ON THE INCREASE?

IN his Statistical Review of England and Wales for 1926, the Registrar-General concluded that "alarmist pronouncements as to increase of mortality from heart disease by 'the stress and worry of modern life'" were not founded on fact, and could indeed be met by the observation that it is declining at all periods of life. The increase in the *crude* mortality (about 13 per cent. between 1911–20 and 1926) is due to two factors: (1) the ageing of the population—standardised rates and rates at ages show decreases; and (2) the "rapidly growing tendency to record cardiac degeneration in certifying deaths of old people formerly ascribed simply to such causes as 'old age,' bronchitis, &c." That the "appalling increase" in the mortality from heart disease observed in the United States is probably equally fictitious is shown in a recent paper issued by C. F. and N. W. Bolduan from the Department of Health of New York.[3] The registered increase in heart disease in New York City has been accompanied by a registered decrease in apoplexy, Bright's disease, and deaths charged to senility. In New York City the efforts of the registrar of records have, it is stated, reduced the deaths charged to senility from 35 per 100,000 of population in 1900 to less than two in 1930, and well over one-half of these deaths are now comprised under the comprehensive heading "cardio-arterio-renal disease." A consolidation of these registered forms of death (apoplexy, acute and chronic heart disease, arterial disease, nephritis, and senility) shows, in spite of the ageing of the population, a practically constant death-rate for cardio-arterio-renal disease over the period 1900 to 1930. Only at ages 65 years and over is there any signs of an increase, and even this increase is slight. At all other ages a distinct fall in mortality is noted. The registered mortality from "heart disease" alone is therefore fallacious; this is the conclusion of these authors, and it is a conclusion which seems well founded. The pathological changes and the ætiological factors in heart disease are not limited to the heart, but include also the arteries and kidneys. Fashions of certification, improving accuracy, and methods of classification of death may play a large part in influencing the recorded mortality in the elements of this group of causes. The great prevalence of cardio-arterio-renal disease presents a very important health problem, which certainly requires no exaggeration by fallacious figures.

[2] Ibid., p. 208.
[3] Jour. of Prev. Med., July, 1932, p. 321.

CARAVANS

WHAT is locally described as the caravan menace is becoming quite serious along certain parts of the Sussex coast. Small caravan towns, with a population of holiday-makers and week-end dwellers, have sprung up here and there on the outskirts of popular resorts and in places are said to be destroying the amenities of the district. What is considered more important is the fact that these settlements have no sanitary arrangements and may become centres of infection. Faced with this situation, the rural authorities are seeking Parliamentary action, led by the Westhampnett rural council which has in its midst caravan settlements at Aldwick, Selsey, Middleton, Felpham, and the Witterings, all of which are by the sea. The authorities are invoking the assistance of the West Sussex County Council in promoting a Bill giving the same powers as were given to the Surrey County Council in its 1931 Act. Power is needed to regulate the uses of all land bordering on the seashore. Many farmers are profiting by letting their fields to caravaners, and although the fields are exempt from rates under the De-rating Act when they are used exclusively for the purpose of agriculture, the rating exemption can be forfeited by devoting the land to another purpose. It then becomes assessable, as in ordinary cases, on the basis of the value to a hypothetical yearly tenant. The local authorities, it appears, are bringing the question to an issue by assessing the farmers. Several of the large towns on the south coast already have powers to check the caravan menace.

EARLY DIAGNOSIS BETWEEN AMŒBIC AND BACILLARY DYSENTERY

Dr. John Anderson [1] writing of the differential diagnosis of dysenteries in the Eastern Mediterranean during the late war noted that early cases of amœbic could be distinguished from bacillary by the microscopical examination of the stools, even if amœbæ could not be seen. In amœbic dysentery, he found, red cells were nearly always present, and apt to be clumped; the eosinophils were much increased; the polymorphs were digested and reduced to pyknotic nuclei, owing to a proteolytic process at work;

[1] THE LANCET, 1921, ii., 998.

and there were few macrophages. In the bacillary stools, on the other hand, there were few red cells, eosinophils were rare, polymorphs were swollen and killed by toxic necrosis, and macrophages (intestinal epithelial cells) were a striking feature. These observations are now confirmed, 11 years later, by Prof. A. Alexieff,[2] of Batoum, who observes that it is not always easy to find *Entamœba histolytica* in the stools of early amœbic dysentery, but that if pseudopyknotic nuclei (Anderson's pyknotic) are present the diagnosis is certain; here he quotes Anderson in support. The diagnosis is clinched, he says, by the finding of Charcot-Leyden crystals and eosinophils, but they do not develop quite so early in the disease. He details clinical cases which support his view that the deeper the seat of infection, the more of these digested polymorphs there will be—many if the infection is submucous, few if it is superficial, for then the ferments of the amœbæ are diluted by the intestinal juice. The amœba, he believes, gives off a proteolytic ferment which dissolves the cytoplasm of the polymorphs, but acts less strongly on the nuclei. In a very severe case, he found 85 per cent. of these pseudopyknotic nuclei, and notes that the similarity between his figure and Anderson's 83 proves the severity of the cases Anderson was concerned with. Alexieff gives drawings of the gradual release of the nucleus of the polymorph, and concludes that the presence of pseudopyknotic nuclei in the stools is the first recognisable sign of the presence of *E. histolytica*.

RECOGNITION OF FŒTAL DEATHS

IN reviewing the radiological signs of intra-uterine death Dr. Otto Brakemann[3] says that as many as 12 of these have been described by various writers. His own experience is based on an examination of 35 cases, and states that the best radiograms are obtained when the uterus is at rest, and, therefore, before the onset of labour and when the head is above the pelvic brim. A pathognomonic sign (first described by Spalding and Homer) is the overlapping of the flat skull bones, the frontal bones sliding under the parietals. Brakemann considers that an equally valuable and much earlier sign which he has encountered as soon as 14 hours after intra-uterine death is a step-like depression of the frontal and occipital bones below the level of the parietals without any overlapping. At the same time, the occipito-frontal diameter of the head is increased. A third sign is the triangular shape of the skull. Towards the occipital end the head is elongated into the form of an empty sac. The lamboidal sutures become widened, and in consequence the small fontanelle gapes widely. These changes are caused by the post-mortem softening of the cranial contents and cessation of the blood and lymph circulation, leading to decreased intracranial pressure, while the intra-uterine pressure of the liquor amnii on the fœtal head is maintained, at the same time as the membranes between the bones are softened. In twin pregnancy death of one fœtus can rarely be diagnosed with certainty apart from radiographic pictures which show the characteristic changes. Brakemann believes that in twin pregnancy the living fœtus can be endangered by poisonous substances emanating from its dead partner. This occurs especially if the partition between the two is torn; but it can, he thinks, happen also when the partition is intact, the injurious materials passing by osmosis from one amniotic sac to the other. He relates a case in which the death of one twin was diagnosed by X rays. Some time afterwards the mother went into labour; the living child presented by the breech and was born without difficulty, but only survived one hour. Post-mortem examination failed to reveal any cause of death, and he concludes that it had been poisoned by the passage of noxious material from the dead twin. On this account he advocates the termination of pregnancy for the sake of the living twin in cases where death of one fœtus has been demonstrated radiographically.

[2] Arch. f. Schiffs- u. Trop.-Hyg., August, 1932, p. 440.
[3] Münch. med. Woch., 1932, lxxix., 1079.

Sir George Newman will deliver the Harveian Oration of the Royal College of Physicians of London at 4 P.M. on Tuesday next.

Dr. Carl Prausnitz, professor of hygiene in the University of Breslau, is giving the Heath Clark lectures at the London School of Hygiene and Tropical Medicine, next week. His subject is the Teaching of Preventive Medicine in Europe, and Sir George Newman will take the chair at the opening address on Monday the 17th, at 5 P.M. The lectures will continue daily at the same hour until the 21st, and no ticket is required for admission.

THE Semon lecture for 1932 will be given by Prof. Otto Kahler of the University of Freiburg, at the house of the Royal Society of Medicine, 1, Wimpole-street, W.1, at 5 P.M., on Thursday, Nov. 3rd. Mr. E. Musgrave Woodman will take the chair, and the subject of the lecture will be the Tonsil Problem.

THE British Congress of Obstetrics and Gynæcology will meet in Birmingham from April 19th to 21st, 1933, the main subject of discussion being the Mechanism of Uterine Action and its Disorders. The hon. secretary is Mr. W. E. Barnie-Adshead, 89, Cornwall-street, Birmingham.

THE annual dinner of the Royal Society of Medicine will be held at the May Fair Hotel on Thursday, Nov. 17th, at 7.30 for 8 P.M. The guests will include Sir Thomas Barlow, Sir Hilton Young, and Sir William Rothenstein.

ROYAL MEDICAL BENEVOLENT FUND.—At the September meeting the committee voted 69 grants, amounting to £1421, as compared with 34 grants, amounting to £577, at the September meeting in 1931. The following are particulars of a few cases helped:—

Widow, aged 65, of M.R.C.S. Since the death of her husband in 1906 she had enjoyed an income of £250 per annum paid from money left in trust. The trustee who had entire control of the trust has proved to be fraudulent and is now in jail. The widow's income has therefore suddenly and unexpectedly stopped as all securities have disappeared, and she is left penniless. Fund voted special gift of £20 and £26 payable in four instalments over one year.

Widow, aged 36, of M.R.C.S. Husband died at the age of 38, leaving widow with a yearly income of £33 and three children, ages 6, 4, and 2, to maintain and educate. The husband had a distinguished war service, received the D.S.O. for outstanding courage, and paid for his medical education from what he received from the war. He was working as a medical officer on a salary of £500 per annum which was eaten up in the simple necessities of life. By his early death from phthisis his widow and three young children are left without means of support. Fund voted a special gift of £20 and £26 payable in four instalments over a period of one year.

M.R.C.S., aged 71. Applicant has worked as a ship's surgeon. He is now totally incapacitated from tuberculous glands in the neck and arthritis. His wife has been in an asylum for the last 40 years. Applicant's income was £96 per annum. He is obliged to employ help in dressing, walking, and general needs. Fund voted £40 payable in four instalments over a period of one year.

Cheques should be made payable to the honorary treasurer of the Fund, 11, Chandos-street, Cavendish-square, London, W.1.

POST-GRADUATE LECTURES

THE following abstracts are from post-graduate lectures delivered in connexion with the special short courses recently held at Charing Cross (Mr. Norman Lake), St. Mary's (Mr. Herbert Tilley), Middlesex (Mr. E. W. Riches), and King's (Dr. J. L. Livingstone).

THE SURGERY OF THE SYMPATHETIC NERVOUS SYSTEM

(MR. NORMAN LAKE)

MODERN interest in the sympathetic system may be said to date from the pioneer work of the English physiologists, Langley and Gaskell. The former included in his "autonomic system" two distinct entities working more or less in opposition—the sympathetic proper, consisting of the central sympathetic cords and ganglia, together with certain peripheral ganglia; and the parasympathetic, consisting of fibres associated with somatic nerves, those from the third cranial passing to the ciliary ganglion, visceral branches of the seventh, ninth, and tenth cranials, and the pelvic branches of the second, third, and fourth sacrals. Langley's conception in its main outlines still gives us the most acceptable working hypothesis upon which to base our studies. While surgical attack has been made upon the parasympathetic side of the system, the majority of operators concern themselves with the sympathetic proper.

Put briefly, the function of the sympathetic system is to prepare the organism for offence or defence, and to inhibit such functions as are not immediately concerned in this protection. Thus, the heart is accelerated and its output increased, the cutaneous vessels are contracted, so passing more blood to the muscles, sweat glands are stimulated, the hair is erected, and the pupil dilated. Peristalsis and secretion of internal viscera is inhibited, but the sphincters are contracted; there is chemical mobilisation of materials essential to a ready supply of energy, and increased function of certain endocrine glands such as the adrenals. Afferent fibres convey impulses from the viscera into the central nervous system, giving rise to that rather vague and diffuse sensation recognised as visceral pain.

The anatomy of this system is too complex to allow of a brief summary, but as a result of experimental and surgical study considerable advances have been made during the past ten years in our knowledge, not only of the anatomical details, but also of the functions of the fibres.

The first deliberate surgical attack upon the sympathetic system was apparently that of W. Alexander, of Liverpool, who excised the superior cervical ganglion for epilepsy; ten years later, in 1889, Jonnesco excised the whole cervical cord for the same condition, and a little later Jaboulay and Jonnesco attacked the cervical sympathetic in cases of exophthalmic goitre. In 1915 Leriche introduced his operation of peri-arterial sympathectomy, and, although this operation has since been shown to be founded upon a mistaken anatomical basis and as a result has been largely discredited, it served to arouse an interest in the possibilities of sympathetic surgery which has not waned since. In 1916 Jonnesco operated upon the cervical sympathetic for the relief of pain in angina pectoris with apparent success. Eight years later Hunter and Royle, in Australia, suggested the operation of lumbar ramisection in the treatment of spastic paraplegia. This operation, also established upon an unsound anatomical and physiological basis, was soon discarded for paraplegia, but every surgeon who performed it was impressed by the very marked vascular change which occurred in the affected limbs, and to which any improvement was almost entirely due. As a result, the possibility of relieving vasospastic conditions by this means was rapidly appreciated and put into practice.

At the present day the following diseases are treated by attack upon the sympathetic system, chiefly the division of the vasoconstrictor fibres, or better, the complete removal of that portion of the chain and its ganglia from which they arise: Raynaud's disease, thrombo-angiitis obliterans (Buerger), scleroderma, Hirschsprung's disease, angina and other visceral painful crises, retinitis pigmentosa, the vasospastic type of rheumatoid arthritis (Adson), and, still more tentatively, causalgia, intermittent claudication, and some painful amputation stumps. Many of the vascular symptoms associated with cervical rib are of sympathetic origin and the removal of the rib should therefore be included in this list. The splanchnic block, so extensively used in abdominal surgery, is also an instance of temporary interference with the sympathetic system, while attempts are being made to achieve a more permanent block by the paravertebral injection of alcohol in appropriate locations, with a view to supplanting operative division, with its attendant risks, in cases, particularly, of angina.

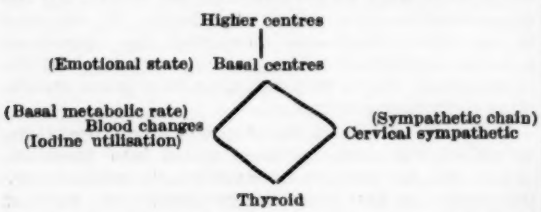
My personal experience is limited to the use of the operations in cases of Raynaud's disease of both upper and lower extremities; for pre-senile gangrene; for spastic paraplegia; for Hirschsprung's disease; for causalgia, and, very tentatively, in an effort to modify the motility and secretions of the stomach. The results have, in the majority of cases, been sufficiently good to give reason for enthusiasm on the part not only of the surgeon but also of the patient, and careful tests of function in the various structures, before and afterwards, have amply demonstrated the change which has occurred. In general, it can be said that good results are to be anticipated in cases of Raynaud's disease, thrombo-angiitis obliterans, and Hirschsprung's disease, and that in each of these the degree of improvement can be estimated beforehand by blocking the sympathetic cord with local anæsthetic or, better, by the administration of a spinal anæsthetic. In the case of the other conditions mentioned the operations must be regarded, frankly, as being very much in the experimental stage, although they have given results of an encouraging nature.

In the case of angina the propriety of any operation to relieve the pain has been called into question, and is still the subject of considerable controversy. Obviously, if the pain be protective or warning in character operative division of the sensory fibres would be a mistake, although division of motor vasoconstricting fibres could not be subjected to the same criticism. Nevertheless, I believe it to be open to great doubt whether it is right to regard pain of visceral sympathetic origin as being a protective mechanism in the sense that most somatic pains are so regarded. However, the question bristles with difficulties, and it is impossible to enter into a discussion of it now; nor would it be of any real value,

for what the practitioner wants to know is what class of disease to refer for surgical treatment, with reasonable hope of amelioration or cure, and I hope that the answer to that has already been made sufficiently clear. Of the future it is difficult to say much. Our knowledge of the distribution and working of the sympathetic system is still very imperfect, and intelligent anticipation of possibilities is correspondingly limited. Prophecy, without substantiation, is always easy, but alien to the scientific method, and imagination is apt to run riot when uncontrolled by a sufficient knowledge of the facts; yet, so great is the temptation, that, with full appreciation of these criticisms and warnings, I shall surrender myself for a brief moment.

The very clear association of certain organic changes with emotional states has long been recognised—exophthalmic goitre, mucous colitis, and atonic visceroptosis, to take three at random, have each their characteristic emotional state. The relationship between the two aspects of the disease have, in the past, been thought to be of a subtle nature, not capable of easy analysis. It may well be, however, that in the sympathetic nervous system we have a "mechanism" by which this relationship is effected, thus placing it upon an anatomical and physiological basis. The emotions are very closely related to the activities of the sympathetic system, may indeed be but the appreciation of the reflex responses of this system to appropriate incoming stimuli. Upon this thesis, therefore, the alteration in sympathetic response which produces the organic change must of necessity be associated with an emotional change, since it constitutes the physical basis of that emotion.

Such a viewpoint must change considerably our ideas as to the nature of these diseases, and may possibly lead to drastic alterations in the method of attack. It is beyond doubt that such a disease as exophthalmic goitre may be treated with success of varying degrees by the surgeon, the radiologist, the physician, and the psychologist, each with his individual ideas of the pathogenesis of the condition. Such an anomaly, however, becomes easier of explanation if we think of this disease as a circle, in which the basal centres of the brain, the cervical sympathetic system, the thyroid gland, and the blood form four segments. Thus, if there be any change in the response of the basal ganglia (the experimentally located centre of sympathetic activity), this will produce corresponding changes in the activities of the whole sympathetic system, including the glands which it controls—e.g., thyroid and adrenals—and



this alteration will constitute the physical basis of an emotional change (the "emotional centre" also has been located in the basal ganglia). This circle is cut into by the surgeon when he performs a thyroidectomy, by the radiologist when he reduces the activity of the gland, by the physician when he attempts to neutralise the toxic thyroid secretion in the blood, by the psychologist when, by analysis, he affects the response of the basal centres; and finally Jaboulay and Jonnesco have both achieved some measure of success in the treatment of this disease by excision of part or the whole of the cervical sympathetic chain. This conception is perhaps best made clear by a graphic representation (see above). A similar relationship can be shown to exist in other physical diseases associated with emotional states. Is it too much to hope therefore that the sympathetic system will prove to be the link between physical and psychical, and that the surgeon's knife may thus have its repercussions upon the emotional state of the patients?

While this aspect of the subject interests surgeon and physician alike, the former may see in the sympathetic nervous system a means of altering the function of structures quite remote in its conception to the present-day surgery of direct mechanical attack. Here we must add a further observation of great importance. It is possible that prolonged disturbance of function may produce definite organic changes, a thesis that is ably supported by the recent work of Telford and Stopford upon thrombo-angiitis obliterans where the well-known organic obliterative changes in the vessel wall are preceded by a primary functional spasticity dependant upon a sympathetic lesion.

If such "surgery of function" should eventually replace the clumsier methods of to-day the faltering attacks which we are now making upon the sympathetic system will not have been in vain.

PURULENT NASAL DISCHARGES

(MR. HERBERT TILLEY)

IT is perhaps natural that those of us who confine our attention to diseases of the ear, throat, and nose are often surprised by the little attention which is given by members of our profession to such an obvious and common symptom as a purulent nasal discharge. I say "surprised" because we all know how many diseases are of septic origin, and can often be cured by the removal of the focus of infection.

For example, a patient complains of "chronic nasal catarrh"; if questioned he may say that it is chiefly on one side, and that sometimes he has noticed a streak of yellow in the discharge when he blows his nose. What happens? His throat is inspected and practically no examination made of the nasal cavities, but he is given a prescription for an alkaline nasal wash to be followed by a nebulised spray of an oily medium containing menthol or chloretone. So things drift on until some definite local or distal symptoms declare themselves, which call for a careful search for some hidden source of septic infection.

A purulent nasal discharge may be met with at all ages from the cradle to the grave. In the new-born child we are familiar with the condition in congenital syphilis or from some septic contamination during parturition. In children up to the tenth year, or even later, a foreign body should always be suspected if the discharge is unilateral, and particularly so if a little blood is sometimes mixed with the pus. Should examination exclude this possibility, the antral sinus will generally prove to be infected. In this connexion I would like to emphasise the fact that within recent years it has amply been proved that children are by no means exempt from infection of their nasal sinuses. A bilateral mucopurulent nasal discharge in those of tender years is one of the commonest symptoms of adenoids, for when these are mildly infected the

small and blocked nasopharynx hinders their profuse secretion from passing downwards into the lower pharyngeal regions.

I will henceforward confine my remarks almost entirely to the antrum as a frequent source of purulent nasal discharge, but it will be readily appreciated that as the other sinuses are not only in close anatomical relationship, but are also organically associated by a continuous ciliated mucous membrane. This has a practical bearing, in that neglect in the diagnosis and treatment of one infected sinus may sooner or later lead to involvement of its neighbours—e.g., it is a common experience to find apparently recent types of inflammation in the anterior ethmoidal cells and frontal sinuses associated with a similar but more chronic condition in the antrum.

Infection is, of course, due to bacteria, and it is generally of a mixed type in which staphylococci, streptococci, and pneumococci are in evidence, although either of these may predominate the others. In acute infections—e.g., influenza and the acute specific fevers—pure cultures of the invading organism have been obtained. If the pus has a foul odour, its dental origin should be suspected.

Acute inflammation of the maxillary antrum.—This is a frequent complication of an acute coryza, influenza, and the acute specific fevers. In such cases the infection passes from the nasal cavity into the antrum—and often involves the other sinuses which, by reason of their dependent drainage, tend to recover more quickly than the maxillary air cell in which the "ostium" is comparatively high up on its inner wall and is also covered by the swollen tissues of the middle turbinal. Another and not infrequent source of acute antral inflammation is the bursting into its floor of infective material from the apices of the roots of the second bicuspid and the first and second molar teeth.

The main symptom is acute pain in the cheek, often of a neuralgic type, and the patient will experience considerable tenderness if pressure be applied beneath the cheek on the anterior wall of the canine fossa. Sometimes the chief complaint is severe pain above the inner half of the corresponding orbit, but it does not necessarily imply that it is due to inflammation in the frontal sinus—in other words, it is a "referred pain," of antral origin. Transillumination of the antrum by means of a 4-volt lamp held in the closed mouth, and with the head covered by a dark cloth, will sometimes demonstrate that the suspected sinus does not show so clear an infra-orbital crescent of light as that on the normal side. (The small torch-light used for examining a throat will often suffice for this test.) You will now examine the nasal cavities, and first of all the healthy side, which will be fairly patent and covered with pale pink mucous membrane, while the suspected side would be obstructed by swollen congested mucosa and possibly a quantity of mucoid or mucopurulent discharge. If you spray on to, or apply to, the mucous membrane a 10 per cent. solution of cocaine and examine again in about five minutes, it may be possible to see the anterior regions of the middle meatus, wherein you may be able to detect a definite yellowish discharge. This will clinch the diagnosis in so far as antral infection is concerned. In cases of dental origin the symptoms are rather different, in that the patient will tell you that he had a bad toothache which suddenly passed off, and he then noticed a foul smell, and discharge from the nose from the same side.

In cases of intranasal origin treatment will be both general and local. The former will largely depend on the nature of the infection. If it is of influenzal origin, rest in bed will be necessary, and the pyrexia must be treated by ordinary remedies. Neuralgia and pain in the cheek will be greatly minimised by aspirin grs. 7, pyramidon grs. 3, salicylate of quinine grs. 2, codeia gr. ½, given in a cachet every four to six hours. Hot fomentations to the cheek are often very acceptable. It is most important to promote free discharge from the antrum. This can be much encouraged by applying beneath the anterior half of the middle turbinal a thin pledget of wool or gauze soaked in equal parts of 10 per cent. cocaine and adrenaline. If you can do this every three or four hours for at least a day, you may promote a drainage of septic material from the antrum and thus initiate a cure. What is still better is scarification of the anterior half of the engorged tissues of the middle turbinal and the adjacent meatus—it is often surprising how this local depletion adds to the patient's comfort, in addition to promoting freer discharge for the antral secretions.

If the antral trouble arises from a diseased tooth, this must be removed, the upper regions of the alveolus enlarged, and daily irrigation practised until the discharge ceases. The prognosis in such cases is good, and restitution should be complete in ten days to a fortnight.

Chronic antral suppuration.—Here let me repeat my warning that a patient's statement that he is suffering from "chronic nasal catarrh" often turns out to mean that the cause of the troublesome discharge is infection of one or more of the nasal sinuses. It will probably be a correct diagnosis if the symptoms are unilateral, because there is no such disease per se as a unilateral chronic nasal catarrh.

As a rule there are three predominant local symptoms: (1) A chronic yellowish discharge from the corresponding nasal cavity. It is often offensive, and particularly so if the antral infection be of dental origin. (2) Some degree of nasal obstruction. (3) Headache, generally supra-orbital, worse in the earlier hours of the day and wearing off about midday. The general symptoms may be merely those indicative of a mild toxæmia—e.g., never feeling fit, unrefreshing sleep, or lack of concentration on work. In other instances, digestive disorders are complained of, a fact not to be wondered at when one remembers that an ordinary adult antrum will hold at least an ounce of pus, and a considerable quantity of this would be unconsciously swallowed.

"Chronic laryngitis," "bronchial catarrh," and asthma are not uncommon symptoms resulting from the passage of septic organisms into the lower air passages. In all patients who suffer from recurrent pulmonary symptoms, mild or severe, it would be wise practice to make sure that the focus of infection does not lie in the nasal sinuses. The same would be equally true when looking for the cause of fibrositis, neuritis, and arthritis. It is interesting to notice the excellent work which during the past few years has been carried out by Drs. Graves and Pickworth and Watson-Williams, bearing on the relationship between mental disease and septic infections of the nasal sinuses. In many instances these septic psychoses—as Dr. William Hunter has termed them—have been cured by removing the source of infection.

Diagnosis will demand a close inspection of the middle meatus of the nose, and if pus is to be seen there you will have first to decide if the antrum is infected. Transillumination, as already described, may show an absence of the infra-orbital crescent of

light, a helpful but not confirmatory test, though of much value if pus has already been detected in the middle meatus. Puncture-irrigation is, however, the only reliable test. A fine trocar and cannula is passed through the inner antral wall, generally beneath the inferior turbinal, the trocar is withdrawn, a syringe affixed to the cannula, and the sinus washed out with warm normal saline solution. Others pass a suction-syringe through the inner wall *above* the inferior turbinal, inject a sterile saline solution, and by suction remove the contents of the antrum both for diagnostic and bacteriological purposes.

The basic principle of treatment is to provide an opening in the lower part of the inner antral wall which will ensure free, spontaneous, and permanent drainage. The best operation is that introduced independently by Caldwell, Luc, and Spicer. The canine fossa is exposed, and its bony wall removed so that the interior of the antrum can be thoroughly inspected and diseased tissues removed. A counter-opening is next made by removing the whole of the inner antral wall below the attachment of the inferior turbinal. The bucco-antral wound is then closed. In children and young adults with sound teeth, and also in adults when there is no ethmoidal complication, the naso-antral opening can be made by brazing inwards the inferior turbinal, and then by suitable punch-forceps, removing the lower half of the inner antral wall. If the infection be caused by a septic tooth, the antrum should be entered through the canine fossa because there will often be found a mass of septic granulations above the focus of dental infection, and this could not be efficiently dealt with by way of the nasal cavity.

Ethmoidal suppuration is frequently present to some degree in cases of chronic antral suppuration because infection from the latter is so liable to enter the closely adjacent anterior group of ethmoid cells. In such cases there is a tendency for polypi or other mucous membrane hypertrophies to form, and these would increase the nasal obstruction. The extension of suppuration through the ethmoidal labyrinth may eventually bring about much increase of the nasal discharge accompanied by increased headache. In such cases infection will frequently involve the frontal sinus, and graver issues, fortunately uncommon, will arise should it gain access to the orbit and its contents or to the meninges.

The diagnosis of suppurating ethmoiditis would be established by the quick recurrence of purulent discharge when the cells are probed after the antrum has been thoroughly cleansed by puncture irrigation. The operative treatment of ethmoiditis not only requires, but demands, a very detailed knowledge of the anatomy and pathology of the region. Its intimate anatomical relationship to the orbit and its contents, to the meninges by way of the cribriform plate and the dural sheaths of the olfactory nerve expansions make it a very dangerous region for any but the skilled and experienced nasal surgeon. More deaths have occurred after surgical treatment of the ethmoid than have followed all other intranasal operations put together.

Here I must stop, without discussing the symptoms, diagnosis, and treatment of suppuration in the frontal and sphenoidal sinuses. On this occasion it is unnecessary to attempt to do so, for when a chronic purulent discharge is caused by a combined infection of all the sinuses, the differential diagnosis of their share in the condition is one which is always difficult. Its surgical treatment demands the most careful manipulations and, above all, a conscientious regard for the safety and sanctity of human life.

PROSTATIC OBSTRUCTION, WITH SPECIAL REFERENCE TO PER-URETHRAL OPERATIONS

(MR. E. W. RICHES)

PROSTATIC obstruction of some degree is one of the commonest affections of men of advancing years, but one which is readily amenable to treatment. Prognosis depends largely on the amount of renal damage, the nature of the prostate encountered, and to some extent on the type of operation performed. The duration of symptoms is some index of the amount of renal damage; as regards the nature of the prostate, the most important distinction is between malignant disease and benign hypertrophy, and, in the benign types, between the adenomatous or glandular enlargement and the fibrous prostate. The type of operation performed must depend on the general and local condition of the particular patient, and with the methods now available it should be possible to select the optimum treatment for each case.

The earliest symptoms are some increase in frequency of micturition, necessitating urination once or twice during the night, and a less forcible stream, with a little delay in starting and terminal dribbling. These are often disregarded by the patient, and it is not until frequency and difficulty become acute, micturition becomes painful, or acute retention or hæmaturia supervenes that he presents himself for treatment. Perhaps it is for his ultimate benefit if an exposure to cold, or alcoholic excess, precipitates these late symptoms and so leads him to seek advice earlier.

Examination of the early cases must be complete, and as rectal palpation so often fails to reveal the true state of affairs the examination must include cystoscopy. Intravesical projection of the prostate may be slight, but the amount of trabeculation in the bladder is an index of the degree of obstruction; the volume of residual urine should be ascertained at the same time. The passage of a cystoscope is often followed by a considerable temporary improvement in urinary function, the degree of which may be an indication for further treatment by dilatation before any operative intervention is desirable.

Despite improvements in technique and after-treatment the mortality of suprapubic prostatectomy is still high, post-operative complications are not uncommon, and the results in certain cases are not entirely satisfactory. We must therefore be ready to consider the possibilities of *per-urethral methods* of treatment, interest in which has been recently revived in this country. The credit for being the first to suggest the division of obstructions at the bladder neck by this route goes to Guthrie, an English surgeon, who, as early as the beginning of the nineteenth century used a knife concealed in a catheter for the purpose. Subsequent developments have come from France, Italy, America, and England, and at the present day there are instruments with which such obstructions can be seen and removed, and this without the excessive bleeding which frequently accompanied the earlier procedures. This advance has been made possible owing to the development of the diathermy current by means of which tissue can be coagulated, or cut with little bleeding, the term endothermy being sometimes given to the cutting current. Modern instruments fall into two main classes:—

(*a*) The coagulating type, with which the obstructing tissue is first coagulated by diathermy and then removed with a punch, or left to slough away.

(*b*) The cutting type, which employs a wire loop activated by a cutting current, and by means of which the tissue can be excised with little bleeding and without preliminary coagulation.

On general surgical principles the latter would appear to be the better type, for it leaves a minimal surface zone of dehydration on which healing readily occurs; whilst in the former type sufficient coagulation to prevent bleeding is likely to be followed by rather deeper necrosis which will provide a medium for the spread of infection. This objection is to some extent overcome in the Bumpus instrument, where the circular cutting punch follows accurately in the cylinder of tissue previously desiccated by multiple needle electrodes, and it is probable that resection can be more rapidly carried out by this type of instrument. I have preferred, however, to use the cutting type which, although it entails the removal of smaller and more numerous pieces, appears to leave a cleaner post-operative field.

The most modern of the cutting instruments is the McCarthy electrotome; it is essentially a modified posterior urethroscope. Vision is provided through a telescope giving a fore-oblique view, the field being kept clear by continuous irrigation. Hæmorrhage is slight, but any spurting vessel can be controlled by light coagulation with a ball type of electrode. The actual cutting mechanism consists of a wire loop movable to and fro by a rack-and-pinion movement and insulated from the rest of the instrument but connected with the source of diathermy. After the urethra and bladder neck have been examined, the loop is advanced to just beyond the obstruction, the ocular end is elevated, the current turned on, and the loop slowly withdrawn, during which movement it cuts through the projecting prostatic tissue. The piece, about an inch in length by a quarter of an inch in depth and width, usually adheres to the loop and is removed after each cut. When a sufficient amount of tissue has been removed, it should be possible to see from the verumontanum to the trigone of the bladder. Removal of the obstructing part only is aimed at, and the amount will vary therefore in different cases. A catheter is then inserted, the endoscopic tube withdrawn over it, and the catheter tied in; it is an advantage to use a self-retaining catheter of the Malecot or Pousson type.

Choice of operation.—In a purely glandular type of enlargement with considerable intravesical projection in an otherwise fit man an excellent result can be anticipated from suprapubic prostatectomy, and this is still the operation to be advised in such cases. In general, the larger the prostate the more suitable it is for suprapubic removal.

The selection of cases for per-urethral treatment depends on the local condition of the prostate and the general condition of the patient; as regards the local factor the operation gives most promise in the following types:—

1. Early glandular hypertrophy with only moderate intravesical projection.
2. Fibrous prostates.—After suprapubic prostatectomy convalescence is usually smoother in the glandular than in the fibrous cases; the same obtains after endoscopic resection, but to judge from the small amount of material at present available the latter is the more satisfactory operation.
3. Carcinoma.—Endoscopic resection can prevent or delay the necessity of suprapubic drainage with its attendant discomforts; it may have to be repeated.
4. Calculous prostatitis, if the infection can be controlled, should be more suitable for endoscopic resection than for suprapubic prostatectomy.

The general considerations are those which make suprapubic prostatectomy a hazardous procedure, such as cardiovascular or respiratory disease, extreme age or obesity; per-urethral methods are less hazardous, and the operation can be carried out under low spinal anæsthesia. In cases with impaired renal function, much cystitis, or acute retention, the preliminary establishment of suprapubic catheter drainage is a factor of safety; any pre-operative infection must be rigorously treated. There must be some mortality from this as from any operation in this type of case, but it is considerably less than after prostatectomy.

After operation the catheter is left in for two to four days with frequent irrigation; on its removal the patient can pass water, but some residual urine remains which must be removed as required until post-operative œdema subsides. Micturition is sometimes painful at first, and there may be transient slight loss of control, due probably to stretching of the external sphincter by the instrument. The patient leaves hospital after seven to ten days, and his sexual function is not altered by the operation.

As disadvantages may be cited the possibility of recurrence of obstruction, or of missing an early carcinoma, although the pieces are suitable for biopsy. The chief dangers appear to be sepsis and urethral shock. The operation demands much patience, but time spent at it is more than regained in the after-treatment.

ASTHMA AND DESENSITISATION

(DR. J. L. LIVINGSTONE)

DESENSITISATION of asthmatics, as of other allergic patients, may be either specific or non-specific. Specific desensitisation is carried out with the actual substance to which the patient is sensitive; non-specific desensitisation with some substance which is antigenic. Allergy is thought to be due to the presence in the blood stream of too many unsaturated antibodies; a non-specific substance used as a desensitising agent reduces the allergic state by causing saturation of some of these antibodies.

Specific desensitisation may be produced orally, intradermally, or subcutaneously. The oral method is useful with children, who are most commonly sensitive to substances like egg, milk, wheat, and fish. In a case sensitive to egg, for example, the patient is put on a diet containing no egg for 14 days and given daily a mixture containing acid. hydrochlor. dil., ℥iss., and pepsini glycerinum, ℥i., in a tumbler of sweetened orange juice and water. At the end of a fortnight one drop of egg-white is added to this mixture, and later two drops. Gradually the dose of egg-white is increased up to ℥i., and by the time the patient can take this amount of egg-white in the mixture he can generally tolerate the amount of egg usual in a normal diet. I am sure that the hydrochloric acid mixture helps in the process of desensitisation.

In desensitising a patient by the intradermal method, better results seem to be obtained if the injections are multiple. An extract of the specific substance, just sufficiently strong to produce a wheal when given intradermally, is prepared. The patient is taught to prick himself with a sterilised sewing-needle, and to rub one drop of the extract into the wound. He performs this operation twice daily until a wheal ceases to appear on application of the extract. He is then provided with a slightly stronger concentration of the extract, and repeats the process. The strength of the extract is gradually increased until no wheal is produced, even with high concentrations.

The subcutaneous method is often useful in cases of asthma due to house dust. Dust from old houses

and furniture is often responsible for asthma and gives positive skin reactions, but street dust rarely produces skin reactions. To make the necessary extract, a portion of dust from the patient's house is shaken up with ether to remove fats, and then mixed with a small quantity of Evans's solution, an alkaline buffered saline solution. It is left to digest for 24 hours and is then dialysed. The concentrated fluid left after dialysis is filtered through a Seitz filter to get rid of any organisms left by the ether, and a culture is subsequently made from it to ensure that it is sterile. It is then made up in dilutions ranging from 1 in 10 to 1 in 100,000. It has been found that these specific substances are inactivated by boiling, are non-dialysable, and resist digestion by trypsin. If the patient gives a skin reaction with a 1 in 10,000 dilution of the extract applied intradermally, it is wise to begin with a small dose of the 1 in 100,000 solution subcutaneously. This method is worth trying on the perennial asthmatic who is better out of doors or away from home. The trouble is that the extracts are expensive to prepare, and a patient has been known to move into a new house and make a complete recovery just as the extract was ready for trial.

For *non-specific desensitisation* old tuberculin (T.O.A.) is a valuable agent. The chief thing is to avoid giving too big a dose; it is advisable to begin with a very small dose and to work up until a reaction is obtained, after which the dose should not be increased further but kept at the same level. Another method of non-specific desensitisation is by autohæmotherapy; 5 c.cm. of blood are withdrawn from the patient's arm and reinjected immediately into the buttock; the amount of blood withdrawn at each treatment is increased until about 40 c.cm. are being drawn off and reinjected. This method occasionally keeps the patient free from asthma for about three or four months.

"Proteose" is used to desensitise patients by G. H. Oriel at Guy's Hospital. Proteose is a protein derivative easily extracted from the urine of the patient by ether. A certain number of cases do well under this method, and though I have not been able to secure quite the same results as those obtained at Guy's, I have seen some of the cases treated there, and am convinced that there was something in the use of proteose.

Vaccines are sometimes useful; in patients whose asthma has followed an attack of bronchitis, the anticatarrhal vaccine prepared by Parke, Davis and Co. can be used, but it is important to begin with a minute dose. Patients with asthma are far more sensitive to a dose of vaccine than is a normal person, and the preliminary dose should not exceed one-hundredth of the dose recommended for normal people.

SPECIAL ARTICLES

EXPERIMENTAL INVESTIGATION OF CANCER

IMPERIAL CANCER RESEARCH FUND'S REPORT

VITAL staining and the radiotherapy of cancer are the two main subjects considered in the nine papers forming the tenth scientific report of the Imperial Cancer Research Fund. Although at first sight these two lines of investigation seem to be independent of each other, the report shows that conclusions derived from one have an important application to the other and more generally to the chemotherapy of cancer.

VITAL STAINING

When an acid dye such as trypan-blue is injected into a living animal, dye droplets make their appearance in certain of the cells—particularly in the macrophages, where they accumulate in larger droplets, and also in the cells of the connective tissue and of the liver and kidney. No droplets appear in epidermal, gland, or germ-cells. This process of vital staining may be produced, as it is especially in the macrophages, by a phagocytosis of the dye droplets, or it may be the result of the passage of the dye into the cells which then actively segregate the dye; and it is difficult sometimes to distinguish between these two processes. Dead cells, or cells undergoing degenerative changes, such as keratinisation, also stain with trypan-blue; but this is a more diffuse staining produced by a passive coloration and is easily distinguished from the two forms mentioned above.

In a series of papers previously published Mr. R. J. Ludford, D.Sc., has discussed this process in detail, with special reference to the difference between normal cells and malignant cells, by injecting trypan-blue into mice and rats with spontaneous or transplantable tumours. He found that malignant cells, unlike their normal prototypes, remain almost entirely unstained. This distinction is particularly clear between normal fibroblasts which segregate the dye and sarcoma cells which do not, and also between normal and malignant mammary cells. The distinction also exists between normal and malignant cells of the skin, but it is here more a difference in degree than in kind. These observations have been carried further in two papers published in this report by Dr. Ludford and by Dr. Leslie Foulds. Dr. Foulds, in observations on six varieties of filtrable tumours of the fowl, found that the cells of five sarcomata or fibrosarcomata behaved like the sarcomata of mice or rats; they did not segregate trypan-blue under conditions which lead to its active segregation by histiocytes and fibroblasts. The sixth tumour, an endothelioma, showed, however, areas of cells containing relatively large masses of dye, while in other parts of the tumour the cells were free from dye droplets. Where this massive accumulation took place it was interpreted as being due to active phagocytosis and not to segregation.

Dr. Ludford has extended his observations to normal and malignant cells cultured in vitro in a medium to which trypan-blue had been added. The results confirm his previous observation that cancer cells do not segregate trypan-blue in the same way as their normal prototypes. In tissue culture of malignant cells it is difficult to distinguish between the malignant cells and the macrophages which wander out from the explants. The method of vital staining in vivo affords a means of distinguishing between the two since the macrophages stain intensely while the malignant cells do not.

The phagocytosis by certain cells of the body, especially the macrophages, of colloidal particles of a dye such as trypan-blue resembles in many respects the phagocytosis by them of particles of inorganic colloids. This is a phenomenon usually described as "blockade of the reticulo-endothelial system." In recent years attempts have been made to use this phenomenon in the chemotherapy of cancer by the injection either of dyes such as isamine blue or of

inorganic colloids. Very contradictory results have been reported both in the treatment of human cancer and in the experimental study of transplantable animal tumours. In a paper entitled The Influence of Vital Dye-stuffs and of Metallic Colloids on Resistance to Transplantable New Growths, Dr. Ludford discusses the results of an experimental investigation of this problem. The successful transplantation of an animal tumour is, in effect, an experimental metastasis formation. One of the first results of the experimental investigation of cancer was a demonstration by Bashford, Murray, and Cramer, that there was in the normal organism a resistance to this experimental metastisation and that this resistance could be enhanced in various ways. Later workers have applied the term "immunity" to this condition, a term which is held to be misleading since cancer will arise as readily in an "immune" animal as in a normal animal, and since the induction of so-called "immunity," after a tumour has established itself, will not affect the growth of such a tumour. Dr. Ludford shows that this condition of resistance can be lowered by the injection of trypan-blue. This indicates that in the chemotherapy of cancer by colloids overdosage may be dangerous by diminishing the resistance to metastatic spreading. This effect is probably due to an interference by the colloids with the function of the cells of the lymphocyte and monocyte series, which da Fano, from his cytological analysis of the reaction occurring in resistant animals, believed to have an intimate connexion with the development of resistance.

This argument is carried further in a paper by Dr. Foulds in which he compares the metastatic spread of a transplantable rabbit tumour, the Brown-Pearce carcinoma, in normal animals and in animals injected with trypan-blue. This tumour shows, like many human tumours, a predilection for certain sites, as exemplified by the frequency of metastasis in the kidneys, adrenals, and eyes, while liver and lung are less frequently affected, and the spleen is very rarely the seat of metastases. This predilection manifests itself not only when the primary growth is in the leg or testis, but even when the emulsion of tumour cells is injected intravenously. In animals which have received injections of trypan-blue metastases appear much more frequently, not only in those organs where they are usually found (kidney, adrenal, eyes), but also in the liver and lung, and frequently even in the spleen. These experiments demonstrate in a striking manner the existence of a definite resistance, residing in the different organs, and varying from organ to organ, to the deposition of metastatic emboli. The freedom of an organ from metastasis does not necessarily mean that cancer cells have not reached that organ, but may be due to the organ preventing such cells from establishing themselves there. The fact that this resistance to metastatic spread can be broken through by affecting the macrophage system is of considerable importance for the chemotherapy, and also for the radiotherapy of cancer.

RADIOTHERAPY IN PRECANCEROUS CONDITIONS

The action of radium on normal and malignant tissues is the subject of five papers.

It is known that radium may induce cancer, and it has also been asserted on clinical grounds that irradiation of malignant growths may sometimes have a stimulating effect on cancer cells. It seems therefore that irradiation of a precancerous condition might precipitate the development of malignancy. Dr. W. Cramer has investigated this question by producing experimentally a precancerous skin area by a limited course of tar painting, and then subjecting it to therapeutic doses of radium. This treatment was followed by a delay or even a complete inhibition of a subsequent development of skin cancer. In no case was there any evidence of a stimulating effect by radium. The result is held to be of practical importance in showing that radiotherapy is strongly indicated in precancerous conditions, and that in suitable doses it does not involve any risk. In previous experimental work on the development of malignancy in a precancerous skin area, Dr. Cramer had pointed out that such precancerous conditions may exist in human cancer in the area in which a malignant growth has made its appearance, but extending far beyond the growth itself. If the growth only is destroyed by irradiation a new tumour may arise therefore from the precancerous area which has not been irradiated. That may happen soon, or 10 or even 20 years later. Clinically such a development of a second growth is generally regarded as a local recurrence of the first growth, and is interpreted as indicating that the first tumour has not been completely irradicated. Surgical experience has shown that these so-called local recurrences can be avoided by excising as wide an area of tissue as possible surrounding the growth, or in the case of the breast the whole organ. For this reason Dr. Cramer holds that radiotherapy also should aim at irradiating not only the growth, but the area in which it has arisen, and his experiments demonstrate that such a procedure does not involve the danger of precipitating the development of a new tumour.

SELECTIVE ACTION OF RADIUM

The remaining four papers deal with the mode of action of radium on malignant cells and the attempt to answer the question whether there is any evidence for the alleged selective action of radium on malignant cells compared with normal cells. Since cancer cells differ in their metabolism from most normal cells by their power to split glucose into lactic acid, both in the presence and absence of oxygen, it seemed possible that radium had a selective action on this glycolytic mechanism. Mr. H. G. Crabtree has tested this point by exposing slices of transplantable tumour in vitro to the action of radium and studying the effect of their metabolism. In a long series of experiments he shows that, contrary to expectation, the glycolytic mechanism is very resistant to the action of radium—much more so than the respiratory mechanism—and that the latter is affected equally in both normal and malignant cells. There is therefore no indication of a differential action by radium on the metabolism of cancer cells, and the results do not support the contention that cancer cells are inherently more vulnerable to radiation than normal cells.

In another paper Mr. Crabtree has studied the inactivation of a relatively simple chemical system—an oxidase system—by radium. He finds that the dose of radiation required to produce partial inactivation of the enzyme is several times greater than that required to destroy the metabolism of living cells, and that for this system β and γ radiations produce the same effect, differing only quantitatively.

The finer cytological changes taking place in irradiated cancer cells have been studied in detail by Dr. Ludford. He compares the effect on the cells of two different mammary carcinoma strains—the more differentiated strain 27, and the less differentiated and more rapidly growing strain 63—and of a rapidly

growing sarcoma strain. In addition, the effect on normal mammary cells of lactating mice was observed. The changes in the nuclear and cytoplastmic constituents are described in detail and illustrated by numerous text-figures. The general conclusion is arrived at that the primary effects of irradiation on the colloidal state of the protoplasm are probably the same in all cells, as well as a concomitant inhibition of mitosis, but the capacity of recovery as well as the later changes differ widely with different types of cells. This applies both to normal and malignant cells. The greater outburst of mitotic activity, after irradiating the more rapidly growing tumours, probably results in a larger number of non-viable daughter cells, and hence greater cell-destruction. It is however recognised that the direct cellular changes do not adequately account for the complete regression of malignant growths after irradiation, and that irradiation has no specific action upon cancer cells as such.

GENERAL THERAPEUTIC EFFECT OF RADIUM

Lastly, in a paper entitled Experimental Observations on the Therapeutic Action of Radium Dr. Cramer raises the question whether in addition to the local action there is a general therapeutic effect of irradiation, as has been suggested. He records experiments which appear to rule out completely this suggestion of a general therapeutic effect. This is followed by a discussion whether the local action of radiation is due entirely to the destructive action of radium on the malignant cells by some selective action, or whether there is in addition some other indirect effect which forms an essential part of the therapeutic action of radium. He shows that a dose of radiation sufficient to ensure regression, if the tumour is left in situ, does not directly destroy all the malignant cells of this tumour, because these irradiated cells will again give rise to new tumours if removed immediately after irradiation and inoculated into new animals. But although these cells have not all been killed they have been damaged; for the tumours obtained by inoculating these irradiated cells grow more slowly than the tumours from non-irradiated cells. If an interval of several days is allowed to elapse between irradiation and subsequent transplantation, the number of tumours formed from the inoculated irradiated cells diminishes, and it is only about eight days after irradiation that the inoculations give consistently negative results, indicating that the irradiated cells are now dead. Moreover, irradiation in vitro, where a very thin slice of a tumour is exposed to radium so as to ensure a complete irradiation of every cancer cell under optimal conditions, requires a dose which is not, as one would expect, smaller but rather larger than that necessary to produce regression of a whole tumour in vivo. From experiments such as these it is concluded that the assumption generally made at present—that every malignant cell has to be destroyed by a direct local action in order to bring about the regression of malignant neoplasm—is not valid. Some additional process must take place in the irradiated tumour which contributes to the eventual destruction of a malignant growth. By a further analysis of the changes following irradiation it is shown that both in normal and in malignant tissues irradiation damages not only the parenchyma but also the connective tissues, and especially the blood-vessels. This damage is followed by the usual reaction of repair in which the invasion of the damaged parenchyma by numerous macrophages is an outstanding feature. Illustrations are given of this invasion of irradiated tumours by macrophages which attach themselves to the damaged malignant cells, and of the subsequent formation of fibrous tissue, probably from these macrophages, which completes the regression of an irradiated tumour. This conception, which is in agreement with such recent observations as those of Dr. B. D. Pullinger on human material,[1] where the damage done to the blood-vessels has been particularly emphasised, should materially influence our conceptions of the rationale of radium therapy.

The report contains, in addition to over 200 printed pages with numerous text-figures, 55 plates, many of which are coloured. As Dr. J. A. Murray, F.R.S., the director of the laboratory, points out in the introduction to the report, the free use of monochrome and coloured figures, each with a complete legend, obviates the necessity for lengthy verbal descriptions of details in the text, and for most readers the summary and the plates will be sufficient. The report reflects the patient, careful work which characterises the research carried out in the laboratories of this Fund and indicates the wide scope and importance of its activities.

MEDICINE AND THE LAW

A Question of Destroyed Case-notes

DURING an inquest at St. Pancras a doctor explained to the coroner that he had cut off the upper part from all the pages but one in his case-book, and had burned the pieces in order to avoid being in a position to disclose his patients' secrets. The inquest, opened on Sept. 2nd, resumed on Sept. 20th, and concluded on Oct. 7th, concerned the death of Mrs. Tremlett, a woman aged 28, who died in a nursing home. In his final summing-up the coroner (Mr. Bentley Purchase) described the case as one of considerable complexity and importance. The names of two medical practitioners, to whom it will be convenient to refer here as Drs. X and Y, had been mentioned. Dr. X said that he had advised the deceased to see a gynæcologist and that she had herself then mentioned Dr. Y. The patient then entered a nursing home where she died after an operation. When Dr. Y told the husband that his wife was dead, the husband said it was the first time he had heard that his wife had been pregnant. A certificate (not a death certificate), produced during the proceedings, was described by Dr. X as a forgery. Dr. Y, said the coroner, gave the husband a death certificate, "and, if that certificate had been accepted, this inquiry might never have begun." The coroner had pointed out to Dr. Y that the death certificate did not mention the word "operation." Dr. Y explained that it was the first death certificate he had signed for years, and he was rather puzzled about it; it never occurred to him to mention the operation. Dr. M. J. O'Donovan, who conducted a post-mortem examination in the presence of Dr. Y, stated that the anæsthetic and the operation were terminal aggravating factors of the patient's death. There was a perforation which must have occurred 12 hours before the operation. Dr. Y, he said, seemed surprised when the perforation was discovered; Dr. Y called on him next day and seemed anxious to convince him that the perforation had been made at the time of the operation. Dr. Y's own version of this, in the witness-box, was that Dr. O'Donovan said something about some injury caused by a knitting-needle or some other instrument, but that his own opinion was that this could not possibly have been the cause of death. Answering a question

[1] Jour. Path. and Bact., 1932, xxxv., 527.

by Dr. Y's legal representative, Dr. O'Donovan said that the perforation might have been made by a skilled person acting clumsily and might have been made by the patient herself. In his summing-up the coroner expressed the opinion that the woman's injury was not self-inflicted; he did not think anyone would inflict such an injury upon herself when about to go into a nursing home. Referring to the evidence, the coroner commented on the books kept by the nursing home. The matron of the home had previously said that one of the books containing particulars of her patients became so dilapidated that she and her secretary copied its contents into a new book; she had destroyed the dilapidated book; she had finished the copying-out after Mrs. Tremlett's death. She was questioned also about another patient (Miss B), and agreed that Miss B entered the nursing home on July 26th and not August 1st as originally entered. Miss B was also, it appeared, one of Dr. Y's patients; he had paid £10 for her. It was in connexion with Miss B's case that Dr. Y cut off the tops of his case-book pages. She complained, said Dr. Y, that the police had visited her; he then realised that her name was on the back of the page which he had given to the coroner's officer. "Therefore, before the officer arrived, I deleted from the book anything that might permit me to give away any further confidence; I did not consider a medical man should do so; his confidence with his patients should be as sacred as the confessional." Dealing with this aspect of the case, the coroner observed that, while he could understand a doctor regarding his case-book as sacred, and even that he should cut the tops off the pages, he could not understand why he should burn the tops. Unless Dr. Y thought he was deriving some protection from that, it seemed a very peculiar thing to do. As for the nursing home he would have liked to have said that it was free from any possible adverse comment, and he did not want to be understood as making any serious adverse comment about it except that there were considerable errors in the books. "I am going to return an open verdict," concluded the coroner, "which will leave the way clear for others dealing with such matters as death certificates and the keeping of registers to decide whether the facts brought to light here involve any action on their part."

UNITED STATES OF AMERICA

(FROM AN OCCASIONAL CORRESPONDENT)

TUBERCULOSIS IN NEW YORK

In spite of the rapidly declining death-rate from tuberculosis, this disease still takes a toll of over 5000 lives yearly in the city of New York. More than 30,000 cases of active tuberculosis are known to the city health department. The city hospitals care for some 12,000 cases each year.

In a recent analysis of the tuberculosis problem in New York, Louis I. Dublin, president of the American Public Health Association, pointed out that the present death-rate from all forms of tuberculosis in New York City (73 per 100,000 in 1930) is approximately one-quarter of the rate for 1900. He drew attention to the disparity of death-rates at the present time in various boroughs of the city. "The people who, when they lived in Manhattan, on the East Side of the city, showed, uniformly, rates of 150 and up to 200 per 100,000, seem to have left their tuberculosis behind them after moving to the Bronx (57); or to Brownsville, where the rate is only 36." The explanation is not only the improved housing conditions of the newer boroughs; there is an element of selection in those who lift themselves out of congested Manhattan. Dublin believes, however, that of the various factors making for the lower rates, housing is the most important.

A new racial group, the Porto Ricans, have recently made themselves at home in New York, and are helping to maintain the tuberculosis death-rate. Some 100,000 of them are said to live just beyond the "coloured belt" in Lower Harlem. One tuberculosis specialist, who holds a clinic at Mount Sinai Hospital, says that Porto Ricans constitute three-quarters of his patients there. Miss Whitney, statistician of the National Tuberculosis Association, has discovered that of 700 young women who died of tuberculosis in 1930 in New York 34 were Porto Ricans. This gives a death-rate for this racial and age-group four times that of the corresponding age-group in the general population.

A LABORATORY OF PUBLIC HEALTH ADMINISTRATION

Baltimore City is establishing in the sixth and seventh wards of the city a new health district which will be a training area for the Johns Hopkins School of Hygiene. This area contains the hospital as well as the new buildings of the school of hygiene. The director of this training area, who will also be a deputy officer of the Baltimore city health department, is to be Dr. H. S. Mustard. He will come to his new duties from the State health department of Tennessee, where he has been assistant commissioner of health. Dr. Mustard has had experience in private practice, with the U.S. public health service, as director of a national demonstration county health unit, and as a teacher of public health in Vanderbilt University.

FEDERAL RELIEF PROJECTS

To meet the emergency created by economic distress and unemployment in the coming winter certain funds have been made available by Congress, to be administered by a bi-party board, the Reconstruction Finance Corporation. $300,000,000 is available for direct relief provided that the governor of each State makes application and the Corporation satisfies itself that the State is making adequate efforts to cope with the need for relief out of its own resources. Some States have already been refused aid on the ground that their own efforts are inadequate.

A further $1,500,000,000 is available for loans on self-liquidating projects. Municipalities and boards of county commissioners may borrow from this fund as well as private enterprises. Apparently schemes for the construction of water-supply or sewerage systems may be financed by this fund, and an opportunity is thus created to advance the public health while at the same time relieving unemployment.

RESEARCH IN CAUSES OF MATERNAL MORTALITY

In the recent report of the New York State Health Commission a recommendation was made that the State health department investigate for at least one year every maternal death, outside the city of New York, in coöperation with local medical societies, to the end that avoidable factors in maternal mortality might be determined. This investigation is being pursued with diligence. The department transfers to a special form all data that are available from the death certificate. The form is then forwarded to a local representative, who makes every effort to get complete information. It is hoped that by making the investigation while circumstances surrounding the death are still fresh in the minds of attending physicians, valuable information may be obtained.

Preliminary conclusions from this study may be published early in 1933.

A similar study was undertaken in the city of Denver, Colorado, in 1930, both for maternal and infant deaths. The number of the former was, however, too small to yield conclusions of much statistical significance.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

TRACHOMA IN HUNGARY

In the southern parts of Hungary trachoma was prevalent as long ago as the middle of last century; in some districts it took a definite endemic form. A campaign against this scourge was started early in this century by Prof. Emile de Grosz, who organised the following scheme:—

1. Provision for continuous observation of all trachoma cases by means of (*a*) notification; (*b*) ophthalmological examination in schools, factories, and tenements, offices and military barracks, and of apprentices, domestic servants, demobilised soldiers, and recruits; (*c*) examinations of the eyes of the general population, this last being an emergency measure to be applied only on demand by the central authorities.
2. Free treatment in trachoma dispensaries, of which there were eight in the country; the medical service to be supplied by local practitioners for a fixed honorarium originally consisting of 100 crowns a month. The treatment carried out by these practitioners to be under the supervision of the medical officer of health, or of an ophthalmologist.
3. Improvement of hygienic conditions in schools, factories, and workshops; the foundation of industrial colonies in trachoma-stricken districts, in order to check the movement of trachomatous workers, and the support of the families of incapacitated trachoma patients. Soldiers suffering from trachoma to be treated in military hospitals.
4. Stimulation of research into the pathology and treatment of trachoma by means of grants and prizes, and instruction of the public by means of occasional popular lectures and courses.

These efforts bore fruit. In several cities special trachoma hospitals, wards, and eye dispensaries were erected until there were 1200 beds available for trachoma patients alone. In 1911, previous to Prof. Grosz's appointment, 12 experts and 90 parish doctors had been entrusted with the treatment of patients. Prof. Grosz succeeded in persuading the military and civilian authorities to work hand in hand. The Act of Conscription of 1913 contained the provision that those suffering from trachoma, yet otherwise fit for military service, should be placed in a hospital managed by specialists three months prior to the regular time of enlistment. Those who were cured joined their regiments, while those who were incurable were referred to a superior authority. The campaign against trachoma was reasonably successful up to the outbreak of the war. Patients with trachoma at the dispensary of the Budapest university ophthalmological clinic had been reduced from 7·2 per cent. in 1891 to 2 per cent. in 1910, under the schemes organised in 1883 by Prof. Feuer, and the reduction continued under the régime of Prof. Grosz. During the late war trachoma regiments were formed. The official report of these troops, which had been engaged in action, showed that 78·5 per cent. were cured, 21·2 per cent. still required treatment, and only 0·3 per cent. were certified as unfit for military service. With a view to the future release of the men on demobilisation the leaders of the campaign adopted extensive precautionary measures. The men from the trachoma wards were, however, scattered and thus carried the disease to areas hitherto immune. In 1924 the surgeon-in-chief of the army compiled a map on which the soldiers suffering from trachoma were grouped according to the districts to which they belonged. The map showed that the disease was prevalent all over the country.

In 1926 new inquiries were made in schools, institutes, prisons, factories, and tenements. The result was that, of 8,500,000 inhabitants, 10,000 trachoma patients were brought to light. Of 824,984 school-children, 3257 were found to be suffering from trachoma. The treatment was then entrusted to competent physicians for whose emoluments the State assumed responsibility.

Statistics from the eye clinics are illuminating. In the dispensaries attached to these clinics, the number of trachoma patients in Budapest, in 1930, was 1·5 per cent., in Segedin (the second largest city in Hungary), 10 per cent., and in Debretzin and Fuenfkirchen, 5 per cent. respectively. The difficulty of the situation is shown by the fact that of the trachoma patients examined at the university eye clinic upward of 50 per cent. were suffering from pannus, so that the visual power was already endangered. In spite of the critical financial position of Hungary, the sum of 81,000 pengö (£4000) was allocated in 1930 to the campaign against trachoma, over and above the sum of about 245,000 pengö demanded by the hospitals. Even now the number of beds (316) available for the treatment of trachoma patients in post-war Hungary is entirely inadequate.

IRRADIATION OF THE SPLEEN FOR MENORRHAGIA

At a recent meeting of Hungarian radiologists Dr. Horvath stated that he uses irradiation of the spleen as routine treatment in cases of obstinate menorrhagia and metrorrhagia, and in other cases of intractable hæmorrhage. He attributes the good results to the acceleration of the coagulation-time of the blood. His technique is as follows. In cases where the spleen is of normal size and in the normal position the patient lies on her right side, with the left arm raised high above the head. The actual size of the spleen is made out by percussion. X rays are then applied to the area corresponding to the splenic dullness over a field of about 20×15 cm. The focus skin distance is 30 cm., the other factors being 30 kw., 8 ma., with 5 mm. aluminium filter. The treatment is repeated after a lapse of four weeks, and if this does not prove sufficient, another exposure is given after three weeks. In general, not more than three or four irradiations are necessary.

IRELAND

(FROM OUR OWN CORRESPONDENT)

NATIONAL HEALTH INSURANCE COMMISSION

It has been understood for some time that at least two of the National Health Insurance commissioners in the Irish Free State were likely soon to retire under the age rule of the civil service, and, in one case, it is understood that the operation of the rule had been temporarily postponed. It is now stated in the Dublin press that the three commissioners are about to retire on pension, and that in future the administration of National Health Insurance will be in the hands of an officer of the Department of Local Government and Public Health directly responsible to the Minister. The three commissioners, who have held office since the National Health Insurance Act came into force some 20 years ago, are Sir Joseph Glynn, chairman, Dr. W. J. Maguire, and Mr. Alfred Dickie. Although the medical profession has had its differences with the Commission from time to time, and particularly in the early years of health insurance, the change in administration will be regarded with some misgiving. The presence of a

medical man on the Commission was a guarantee that the medical point of view would not be ignored, and in recent years the attitude of the Commission, while impartial, was not unsympathetic with the profession. There is a possibility that under the new arrangements the medical considerations may not be given as much weight as in the past.

ROYAL ACADEMY OF MEDICINE IN IRELAND

The annual general meeting of the Royal Academy of Medicine in Ireland was held on Oct. 3rd, when the annual elections of officers and councils took place. Prof. Thomas G. Moorhead was re-elected president; Dr. T. P. C. Kirkpatrick, general secretary and treasurer; and Mr. W. Doolin, secretary for foreign correspondence. The following presidents of sections were elected:—Medicine: Dr. W. G. Harvey. Surgery: Mr. Henry Stokes. Pathology: Dr. J. McGrath. Obstetrics and gynæcology: Dr. G. Tierney. Anatomy and physiology: Prof. W. J. Jessop. State medicine: Dr. J. P. Shanley. Laryngology and otology: Mr. P. Dempsey.

THE LATEST HOSPITAL SWEEPSTAKE

The drawing for the Irish Hospitals Sweepstake on the Cesarewitch took place last week. It was announced that the total sums received amounted to £3,624,448. This is less by about £500,000 than that received for the last sweep—that on the Derby. Hitherto, each sweepstake has shown an advance on its predecessor. The minimum sum to reach the hospitals in the present case will be £724,889, of which two-thirds will go to the voluntary hospitals.

MEMORIAL TO SIR ANDREW BALFOUR

On Thursday in last week the Earl of Athlone, Chancellor of the University of London, unveiled a memorial tablet to Sir Andrew Balfour, the first director of the London School of Hygiene and Tropical Medicine. The meeting was presided over by Sir Holburt Waring, P.R.C.S., chairman of the Court of Governors of the School, who briefly explained the origin of the movement. The School Council, he said, decided on the death of Sir Andrew to erect a memorial tablet in the school and create a fund to enable students, preferably from overseas, to study at the School. An influentially signed letter had brought in up to date the satisfactory sum of £1200, while in addition, said Sir Holburt, a promise of a bequest of £1000 had been received. The execution of the memorial tablet was, he said, entrusted to Mr. Allan Howes.

The wording of the memorial tablet, on which appears in bas relief the portrait illustrated above, is as follows:—

A TRIBUTE OF GRATITUDE AND AFFECTION
TO
ANDREW BALFOUR
K.C.M.G., C.B., M.D., LL.D., F.R.C.P.
(1873–1931)
IN MEMORY OF HIS DEVOTION TO THE CAUSE OF TROPICAL HYGIENE AND OF HIS SELF-SACRIFICING LABOURS AS DIRECTOR OF THIS SCHOOL

"THROUGH THE BATTLE, THROUGH DEFEAT,
MOVING YET AND NEVER STOPPING,
PIONEERS! O PIONEERS!"

Lord Athlone then delivered a brief address on Andrew Balfour's character and work, describing him as "a man of a thousand enduring qualities and for every such quality he drew to himself a thousand friends." He outlined Balfour's professional career, instancing his successes, and continued:—

"When the South African war broke out we find him on duty in the pestilential typhoid camp at Pretoria, where he himself suffered from a severe attack of the disease. On his return from that campaign he came under the influence of Patrick Manson and devoted himself to the cause of tropical medicine and hygiene. There followed the first great step in Balfour's career in that field. In 1902 he was appointed director of the Wellcome Tropical Research Laboratories at the Gordon College in Khartoum and medical officer of that city. There is no finer record than the work of Balfour during the 10 years which followed. He transformed the dusty, ill-kept, insanitary mud-huts of the Khalifa into a model town, and banished malaria entirely from its precincts. . . During the war he served in France, Salonica, Egypt, and East Africa with the rank of Lieut.-Colonel R.A.M.C. He was a member of the Medical Advisory Committee of the Mediterranean War Area (1915–16), President of the Medical Advisory Committee Mesopotamia (1916–17), and President of the Egyptian Public Health Commission (1918). . . . To the work which was, alas, to prove the last of his labours—the building, the equipment, the organisation of this great school—Andrew Balfour brought the same passionate zeal, the same untiring energy which were characteristic of his whole career, and his inspiring personality is so very fresh in the minds of all of you that of his last great piece of work there is hardly any need to speak. The appointment of Andrew Balfour to be the first Director of this School gave to the School from its very inception a splendid introduction throughout the whole world and contributed perhaps more than anything else to the reputation which it has already established. Balfour was not only a great worker, but what is in my judgment perhaps quite as valuable, he was a great sportsman. You all know how, from the days when he threw his weight into the scrum of the Rugby International until the day of his death when he was President of the Scottish Rugby Union, his love for the game was one of the great passions of his life. Again, he was a prolific writer and lecturer, and as relaxation from the sterner stuff of life he found an outlet for his enthusiasms in the writing of novels of no mean order. Finally, and in a word, Balfour was a great Empire builder. And when I say this I am thinking not so much of his devotion to work, of his vast knowledge and contributions to the subject of Empire health, not of his academic distinctions, not of his contributions to sport and literature, but of his fine character. He was without guile, honest to the core, a man who evoked in his colleagues a spirit of love and sacrifice . . . It is fitting that on the memorial which I am now to have the honour of unveiling, there

are engraved words which Andrew Balfour himself loved.

The Dean of the School, Prof. W. W. Jameson, then accepted with thanks on behalf of the Governors and the Staff, the memorial while expressing the indebtedness of all to Lord Athlone for his presence at the ceremony and practical interest in the affairs of the University of London.

PUBLIC HEALTH SERVICES

Increased Tuberculosis Mortality in Young Women

A noteworthy feature of the latest London mortality statistics [1] is the lack of decline in recent years in mortality from pulmonary tuberculosis amongst young women.

In his annual report for 1927 the Registrar-General of England and Wales pointed out that women of 15–35 years of age formed the only section of the population in which an improvement in mortality from phthisis had not been observed in recent years. The cause of this phenomenon has not so far been adequately explained, though it has commonly been attributed to the increase of young women in industrial and commercial employment. In London, according to the mortality-rates set out in this report, the phthisis mortality amongst women has actually risen between 1911–13 and 1929–31 by 23 per cent. at ages 15–20, and 30 per cent. at ages 20–25. At every other age, and at every age amongst males, a decline is registered. When these deaths from pulmonary tuberculosis, at ages 15–25, are stated as a percentage of the deaths, at the same ages, from all causes, it is found that London shows the greatest relative increase in phthisis, the rural districts of the whole country showing almost no change between 1911–13 and 1928–30. The suggestion is that in the rural areas the occupation of young women has not changed to the same extent as in urbanised areas. Yet when the London figures are considered in more detail by the comparison of two groups of boroughs—those representing the poorest population and those representing better-class areas with a low mortality-rate—it is found that the increase in pulmonary tuberculosis per cent. of all deaths among young women of 15 to 25 is much the same in both groups.

"If change of employment from domestic work to commercial or industrial occupations or 'industrialisation' were alone the cause of the increased mortality from phthisis, the change should be far more conspicuous in the better class areas; for in these the occupation figures of the census years 1911 and 1921 show that, in the ten years intervening between them, the proportion of young women of this age engaged in domestic service decreased by nearly one-half, while in the poorer group of the population the number employed in domestic service is comparatively negligible in both censuses."

An analysis of further available data shows that practically the whole of the increase in mortality from pulmonary tuberculosis in London has been among single women. The obvious explanation that young women suffering from phthisis do not marry is insufficient to explain the considerable divergence between the single and the married. The possibility cannot be excluded that it is the young unmarried woman who is likely to be most adversely affected by economic conditions. As (judging by mortality-rates) their resistance to pulmonary tuberculosis in the early years of adolescence is less than that of young men, it is only to be expected that when adverse economic conditions are added at this period of life the young women will be much more affected than young men. If this is the explanation of the facts an improvement in economic conditions affecting young women wage-earners should be followed by a decline in this excessive mortality.

A factor which has not been considered in this report, but may affect London to a peculiar degree, is internal migration. It has been shown [2] that in all probability the relatively *low* phthisis rates in the *urban* areas and the relatively *high* rates in the *rural* areas among young adults—especially women—are related to the migration of the more physically fit from the country to the town, the town mortality being lowered, the country mortality increased, by this movement of the healthiest. If, as there is some reason to believe, this selective migration to London has been slackening of recent years, the London mortality-rates, especially from phthisis, are likely to be swollen owing to this relative absence of healthier recruits. Though this might be a partial explanation of the abnormal rise shown in the London rates, it obviously fails to be a complete explanation, since, as has been pointed out, the lack of decline in pulmonary tuberculosis in young females extends to the whole country.

The problem is an important one, both to the social worker and the public health worker, and Sir Frederick Menzies has done well to draw special attention to it by this study of the London figures.

The Ex-Sanatorium Patient

In the same report to the London County Council Sir Frederick Menzies refers to the assistance given to tuberculous patients in obtaining employment after residential treatment. A scheme was adopted in 1928 which provides for the training for nursing and domestic service of selected patients at King George V. Sanatorium after a period of treatment and special observation at Pinewood Sanatorium. For men ex-sanatorium patients, two workshops for their employment have been established by the Central Fund for the Industrial Welfare of Tuberculous Persons. This work is still experimental, and the maintenance of the workshops is dependent to some extent upon a subsidy from charitable funds. In addition, in several boroughs, dispensary handicraft classes have been organised for those who are unfit for ordinary employment. The Council sends a number of patients to Papworth Village Settlement and to the Preston Hall Colony, a careful selection being made with a view to the admission of patients most likely to be accepted later as suitable for settlement, while at the Burrow Hill Colony training in gardening and clerical work is given to youths between the ages of 15 and 19 years. A scheme has also been adopted under which arrangements are made for special training to be given here to selected boys, with a view to their subsequent employment in the Council's parks department. In these ways remunerative employment is being found for a certain number of the Council's ex-sanatorium patients in an effort to reduce, even to a slight extent, the economic loss that this disease inflicts upon the community.

[1] Report to the London County Council for 1931. Obtainable from P. S. King and Son, Ltd., Westminster. No. 2918. Pp. 58. 1s.

[2] Med. Research Council, Spec. Rep. Series No. 95.

CORRESPONDENCE

THE GENERAL PRACTITIONER

To the Editor of THE LANCET

SIR,—I have read in the current issue of THE LANCET, with very great pleasure, Dr. E. K. le Fleming's inaugural address at St. George's Hospital and I am glad that he has brought up the subject of the general practitioner. This subject is one about which, in my own small way, I have been agitating for years. At the present time students become qualified and are launched into the world without any knowledge whatever of the very essentials of conducting a general practice successfully, and when I say successfully I mean both as regards the patients as well as regards themselves. I do not think Dr. le Fleming's suggestion goes far enough. I should like to see the old days of apprenticeship revived, though in a modified form. I do not think four years, such as I served, necessary but I do think that before a man is allowed to practice he should be compelled to serve at least one year's apprenticeship with a general practitioner. The result would be incalculable benefit to the public and to the man himself.

I would go further and apply the same compulsion to all intending consultants. They would then have a far better understanding of, and a greater sympathy for, the many difficulties with which a general practitioner has to contend.

I am, Sir, yours faithfully,

E. F. PRATT, M.B.

Clarges-street, W., Oct. 10th, 1932.

HOUSE INFECTION IN BLACKWATER FEVER

To the Editor of THE LANCET

SIR,—In a leading article on blackwater fever in your issue of Sept. 17th (p. 636) it is pointed out that Dr. Ross is in agreement with previous observers in finding no justification for the suspicion that certain houses predispose to infection. While on the staff of the C.M.S. Hospital, Ngora, Uganda, I had an opportunity of studying the disease amongst Indians, and would like to draw attention to the following examples which are evidence to the contrary.

(1) On Oct. 30th, 1930, a man, aged 40, developed an attack of blackwater fever after being given plasmoquine and quinine for malaria. His wife had died from the disease in the same house four days previously.

(2) A man, aged 24, came to be examined on April 22nd, 1931, because he was in anxiety lest he might develop blackwater fever, his brother having died from this disease in his house 13 days before. On examination he was found to have a palpable liver, a spleen whose lower limit was three fingers-breadth below the costal margin and a temperature of 101·2° F. His urine had a specific gravity of 1020, was acid in reaction, and contained no albumin or bile. I considered that he was in the pre-blackwater state though it should be acknowledged that certain authorities, including Drs. Ross and Yorke, Murgatroyd, and Owen,[1] do not recognise such a condition.

(3) A man, aged 24, gave a history of seven attacks of blackwater fever, five of which occurred during the year 1930. His daughter, a girl aged 6, who had been living in the same house, also complained of three attacks all of which occurred during the year 1930.

(4) This is an interesting example of a house in which seven attacks of blackwater fever had occurred, two of them being recurrences three years and four years respectively after previous bouts of the disease. Four of the cases occurred during the space of 11 months, between July 6th, 1930, and May 15th, 1931, one of the patients developing the disease one day after his brother. Of the other three cases one was that of a girl who developed the disease two days after her brother. All the patients were members of the same family with the exception of one man who was a cousin. In no case was the disease fatal.

An examination of the house mentioned in (4) shows some features of interest. The building was situated by itself and was enclosed by an orchard of orange and lemon trees which gave shade to the house and protected it against wind. It had a low thatched overhanging roof. The windows were very small and were unprotected by mosquito-netting. The interior of the house was dark even at midday. There were 11 occupants who were subject to frequent attacks of subtertian malaria. Such a building would be an ideal resting place for mosquitoes which could readily gain entrance through the unprotected windows at night, but owing to the absence of light and draught, would show no inclination to leave during the day. This should be compared with the typical house of an ordinary Indian village in this district which, though unprovided with mosquito-netting, possessed a high corrugated iron roof with a wide interval between roof and walls and usually fairly large windows which, if opened during the day, would allow entrance to light and air. There were only a few small trees in the vicinity.

These observations strongly favour the importance of chronic subtertian malaria, which is the prevalent form encountered in this district, in the ætiology of blackwater fever, and the view that certain houses predispose to the disease by reason of the shelter which they offer to the infected anopheles mosquito.—I am, Sir, yours faithfully,

A. D. CHARTERS, M.B. Camb., D.T.M. & H. Eng.

Sevenoaks, Oct. 4th, 1932.

[1] Yorke, W., Murgatroyd, F., and Owen, D. U.: Trans. Roy. Soc. Trop. Med. and Hyg., 1930, xxiii., 353.

MARMITE IN PERNICIOUS ANÆMIA

To the Editor of THE LANCET

SIR,—In your last issue (p. 782) Dr. A. Goodall records his experience of giving marmite in large doses to 19 cases of pernicious anæmia. Similar findings of my own, as yet unpublished, may be of interest. A year ago I noted in your columns (1931, ii., 63) the occurrence of a reticulocyte response during the administration of bemax, and since that time I have endeavoured to determine the potency of various substances rich in vitamin B for blood regeneration in anæmias. I have found that in Addison's anæmia marmite in doses of 4 oz. daily usually produces a satisfactory reticulocyte response, with a rise of red cells and hæmoglobin, although in some instances the remission has seemed less rapid than with large doses of liver extract. Since these results are obtained in cases of true Addisonian pernicious anæmia with achylia, in which the intrinsic factor of Castle is presumably absent, it would seem possible that yeast contains some substance effective for blood regeneration in this disease, apart from that which Strauss and Castle [1] believe to be the extrinsic factor.

As Dr. Goodall infers in his closing remarks, it would be unwise to let any form of extract take the place of whole liver where subacute combined degeneration of the cord is present.

I am, Sir, yours faithfully,

Newcastle-on-Tyne, Oct. 10th, 1932. C. C. UNGLEY.

[1] THE LANCET, July 16th p. 111.

TANNIC-ACID THERAPY

To the Editor of THE LANCET

SIR,—My use of tannic acid varies considerably from the ideal set out in your issue of Oct. 8th. In the first place burns of any sort are comparatively seldom the occasion for tannic-acid therapy and, in the second, I have never used it except by direct application of the powder to the surface requiring treatment. I do not for one moment suppose that I am alone amongst general practitioners in using tannic acid in this way nor do I claim any particular skill or priority.

There is a type of lesion with which we are all familiar and which is commonly seen on the faces of motor cyclists who have stopped more suddenly than they intended, usually head first. It occurs also on the elbows of venturesome childhood and even more often on the knees. This lesion is made up of a number of small cuts and scratches set close together. Wet dressings stick to it. Dry dressings do the same. Ointments eventuate in a more or less septic sore calling for fomentations. Long before tannic acid was introduced to the profession as a dressing for burns I had made experiments with various powders in the hope of evolving one which would form an antiseptic scab over such lesions and thus obviate the need for any further dressing. I had very fair success, but the coming of tannic acid was immediately hailed as a possible solution of the problem. Experience has not belied the promise. Thus I found myself embarking on a type of tannic-acid therapy in which solutions and burns had little part. Burns occur from time to time in general practice and, as far as my experience goes, are easily and comfortably treated by dusting the tannic powder directly over the burn. But the main usefulness of tannic acid is in other directions.

The *indications* for tannic-acid therapy are (1) the presence of a raw surface on the epidermis which (2) is little or not at all septic and (3) is likely to cause considerable trouble and pain if treated by any application requiring constant renewal. The surface should not be entirely denuded of epithelium except where the total area is two square inches or less.

The *cases treated* include many injuries occasioned by motor accidents and many examples of the raw area left by avulsion of nails with or without destruction of the nail bed: burns, surgical wounds of which the edges are no longer in apposition, one or two small varicose ulcers, and other similar conditions. A colleague tells me that he has had good results from packing the powder into septic sulci caused by ingrowing toe-nails. In general, sepsis is rather a contra-indication but tannic acid is an excellent antiseptic and can deal with minor septic invasions.

Technique.—Tannic acid will not remove from motor wounds traces of dirt and oil. But it will cover these up and keep them sterile so that they become incorporated in the natural scar forming beneath the tannic-acid covering. The result is not good, especially on the face. Tannic acid will control oozing in most cases but not real hæmorrhage unless pressure also be applied. This involves a dressing in contact with the tannic acid. One tries to avoid such dressings. It is far better that the tannic acid should dry and turn black in contact with the air. When a covering is necessary I use wool applied directly over the acid and bandaged in place. After two or three days I pull or cut away all the wool not involved in the scar, that is, all that will come away. No further dressing or bandage is applied.

Where the area treated is small the thickness of powder applied is not of much moment. It can be powdered on and left for about 60 seconds. The surplus is blown away or lightly brushed away with a piece of wool. Where the area is large, as in an extensive burn, one is left wishing that this powder lent itself better to application with some sort of insufflator. I have thought of mixing it with other powders—e.g., finely powdered aspirin which is soothing—but have not actually done so. The biggest area actually treated in the method outlined above was about a foot square. There were two such areas, one on each thigh, caused by boiling water. The case did very well but the protective covering of tannic acid was not as even as one could have wished. In consequence it cracked here and there, and had to be reinforced during the first two days by further applications of the acid. A solution might have done better in this case, but even application of the powder would, I feel sure, have done better still.

I have never encountered any case in which the application of the tannic acid caused distress, although there have naturally been one or two in whom pain was felt on the first far view of the powder. In no case have I earned anything but the goodwill of hospital sisters and nurses by adopting this treatment.

I am, Sir, yours faithfully,

Sevenoaks, Oct. 9th, 1932. GORDON WARD.

FUSO-SPIROCHÆTAL DISEASE OF THE LUNGS

To the Editor of THE LANCET

SIR,—I have read with interest Dr. Heffernan's note in your issue of Oct. 1st (p. 734) on "fuso spirochætal disease of the lung," of which he describes four cases. May I ask what this disease is? The note does not make clear whether it is a purulent bronchitis, a lung abscess, or any respiratory infection in which, amongst many others, Vincent's organisms are found. These organisms abound in the sputum of most cases of single lung abscess, from which condition I believe three at least of Dr. Heffernan's patients suffered. The first two cases gave a typical history of one type of lung abscess. An anæsthetic was given for dental extraction; a few days later there was fever with symptoms and signs pointing to a lesion in the chest; this was followed by the coughing up of a large amount of purulent sputum and rapid cure. The third case seems to have had a lung abscess which ruptured into a bronchus which was inconveniently placed for good drainage and so cure was not complete. The fourth case was somewhat similar, and I think the diagnosis of chronic lung abscess, probably basal, is quite tenable.

I am, Sir, yours faithfully,

London, Oct. 7th, 1932. A. S. HALL.

SAFE MILK

To the Editor of THE LANCET

SIR,—Dr. Carling's letter and the correspondence on it prompt me to bring to your notice a method of home pasteurisation of milk which has been in use in my own household for some time. The requirements of adequate pasteurisation are that the milk shall be brought to a temperature of 145–150° F. without any part of it having been heated above this temperature; that it shall be maintained at this temperature for half an hour; and that it shall then be cooled to the lowest practicable temperature.

The first object is attained by heating the milk in an ordinary jug with an electric immersion heater, rated at 400 watts, which raises a quart of milk to the right temperature in 11 minutes. The heater is stirred continuously, and by this means the heat produced is distributed over a large volume of milk, instead of any portion of the milk being overheated and coagulated, as occurs in a pan over a gas flame. When the jug feels to be approaching the correct temperature a thermometer is placed in the milk. The

current is switched off when the temperature reaches 146° F., although the heater is still kept moving until the temperature ceases to rise. The rise of temperature after switching off varies with the quantity of milk being heated; with a quart the rise is about 2° F.

The object of the second stage is attained by pouring the heated milk into a warmed vacuum flask (or flasks), which is then stood in a warm place for half an hour. During this time the temperature of the milk falls only about 1° F. Meantime the jug which is to receive the milk is scalded out with boiling water, and when the milk from the flask is poured into it the jug is placed in a large dish of cold water.

By these means the requirements of satisfactory pasteurisation are fulfilled. There is no doubt as to the milk having been maintained at the required temperature, and its physical properties appear to be in no way altered. The only technical difficulty in the method is the reading of the thermometer. This operation is rather a stumbling block to the uninitiated, and the process of pasteurisation cannot therefore be safely entrusted to the average domestic staff, but must be performed by some member of the household. In view of the advantages of pasteurisation, however, the slight trouble involved is well repaid.

I am, Sir, yours faithfully,

F. C. S. BRADBURY,
Assistant Tuberculosis Officer,
Lancashire County Council.

Oct. 8th, 1932.

RESPIRATORY EFFICIENCY TESTS

To the Editor of THE LANCET

SIR,—The letters from Dr. Corner and Dr. Treadgold in your last issue call for some reply. With regard to the criticism that I have misinterpreted Flack, I cannot agree. I have carefully read the Milroy lectures once again and their impression on my mind is this: good air pilots gave certain standards with the mercury U-tube tests, pilots suffering from strain fell below these standards, the general population will probably also fall below these standards because of physical inefficiency, but if only everybody would perform the exercises elaborated in the third lecture, the Air Force standards might be reached. I think this is a fair summary of Flack's views and I believe them to be in this respect unduly optimistic. The only normal standards at present existing for the tests are those adopted by the Air Force and I attempted to show that for the "hospital population" such standards were useless.

Dr. Treadgold suggests that I have misinterpreted the importance attached to the expiratory force and 40 mm. Hg tests by the Royal Air Force authorities, but I tried to make it clear that these were only two out of several tests employed. The phrase I used about the U-tube tests that they were reintroduced by Flack "for use in connexion with standards of respiratory efficiency for air pilots" was meant to convey this, but I ought, perhaps, to have written "other standards." With the rest of Dr. Treadgold's letter I am in agreement.

I regret my slip in attributing the early spirometric work to *Jonathan* Hutchinson when his name was *John*.

I am, Sir, yours faithfully,

London, W., Oct. 8th, 1932. ALAN MONCRIEFF, M.D.

THYROIDEUM B.P. 1932

To the Editor of THE LANCET

SIR,—There is considerable conflict of opinion about the thyroid extract of the new Pharmacopœia. Certain hospitals have been offered U.S.P. Thyroid Powder, which has an iodine content of 0·2 per cent., as being twice the strength of the new B.P. preparation and several inquiries have been sent to us asking if it is satisfactory to dilute this U.S.P. preparation with equal parts of milk sugar to produce the B.P. 1932 product. It should be borne in mind that Thyroideum B.P. 1932, although being standardised to contain 0·1 per cent. iodine in combination as thyroxine, actually contains more than 0·2 per cent. total iodine. An assay of a good grade thyroid will give a content of approaching 0·3 per cent. total iodine. Of this iodine probably 10 per cent. will be inorganic; of the remaining 90 p.c. thyroxine iodine will account for 30 to 60 p.c. The rest of the organic iodine is in the form of acid soluble di-iodotyrosine, which is physiologically inert. Of the three iodines therefore present in thyroid, only one—namely, acid insoluble thyroxine iodine—is recognised in the B.P. 1932 product, and it is on the thyroxine iodine content alone that the standardisation is determined.

We are, Sir, yours faithfully,

ARMOUR AND COMPANY, LTD.
London, Oct. 8th, 1932. (Laboratory Department).

To the Editor of THE LANCET

SIR,—An important point in connexion with Thyroideum B.P. 1932, which is apparently not generally appreciated, is that this thyroid has no fresh gland equivalent. Thyroid of the B.P. 1932 is a dry gland standardised to contain 0·1 per cent. iodine in combination as thyroxine and every batch of thyroid made has to be adjusted to contain this amount. There is thus no standard equivalent of fresh to dry gland and it will therefore be no longer possible to prescribe and dispense thyroid in terms of fresh gland, as is commonly done at the present time.

Further, it should be noted that thyroid extract, thyroid gland, and dry thyroid are now synonyms for thyroid B.P.

I am, Sir, yours faithfully,

H. W. PAINES, M.P.S.
Fitzroy-square, W., Sept. 28th, 1932.

Dr. DORIS ODLUM asks us to state that her article on Nomenclature of Mental Disease, in our issue of Oct. 1st (p. 754), expresses her own views, and must not be taken to represent the views of the National Council for Mental Hygiene, to which (we stated) she is joint honorary secretary.

A SWEEPSTAKE FOR BRITISH HOSPITALS. — At a special meeting of the council of the British Hospitals Association it has been decided to distribute any money which may be allotted to the Association from a sweepstake held abroad. Sir Harold Pink, the chairman, stated that money so obtained would be used for capital expenditure only. It is understood that a tentative offer has been made by a syndicate to allocate to the hospitals "at least 25 per cent." of the proceeds of a lottery. According to unofficial statements the sweepstakes are to take place under the auspices of the Casino and the International Sporting Club of Monte Carlo. The first sweepstake will be on the Grand National and, to meet the views of the Jockey Club, the draw will not be held until the day of the race.

ROMAN CATHOLIC HOSPITALS. — Dr. Downey, Roman Catholic Archbishop of Liverpool, recently opened extensions to the hospital and nursing home conducted by the Augustinian Sisters at Park House, Waterloo, Liverpool. The enlargements, which have cost £7000, have increased the accommodation for patients from 15 to 32. Eighteen new rooms have been added, including eight private rooms, two maternity wards, a theatre, and a large children's nursery.—A new nurses' home attached to the hospital of St. John and St. Elizabeth, St. John's Wood, was opened recently. The cost has been £18,500, and it will now be possible to house under one roof the staff of 60 nurses who were formerly scattered in three separate houses.

PANEL AND CONTRACT PRACTICE

"Failing to Comply"

THE appeal by the medical officer of a London hospital against a resolution of the London insurance committee, that he had failed to comply with regulations by not personally attending the insured persons for whom he was responsible under contract, was heard on Oct. 7th at the Ministry of Health. The decision of the Ministry is not yet known. In the course of the hearing a rather subtle legal point was raised by the deputy clerk of the committee as to whether there was a difference between "failing to comply" with regulations, and a definite breach of them. He thought there was a difference, but only a very fine one. He suggested that it would have been a breach of the regulations for the doctor in this case to say to his insured patient, who asked for a certificate of incapacity (there being no doubt of the incapacity), "I refuse to give it," but to so arrange matters that he never saw patients at all was failure to comply. The legal assessor thought there was no difference; you could not have a failure to comply without committing a definite breach of the regulations. The case appeared to turn definitely on the fact whether the doctor who did the work—who was undoubtedly non-panel—could be considered as deputy of the insurance practitioner, and as such bound by the regulations.

The Practitioner's Good Name

The Insurance Acts Committee have issued a supplementary report, which will be considered by the Panel Conference when it meets on Oct. 20th. The committee is continually watchful of the interests of the insurance practitioner. It has recently protested to the Ministry of Health at their failure adequately to defend the insurance medical profession when attacked in the House of Commons. A statement has now been obtained from the Minister that the reputation and interests of the insurance panel will on all occasions be appropriately protected and defended to the best of his ability.

Exchange of Views

The Insurance Acts Committee had suggested to the Ministry that before a regional medical officer reports to an approved society that an insured person is fit for light work or other occupation there should be an opportunity of exchange of views between him and the practitioner. The Ministry disagree with this; in this class of case, they say, it is open to the practitioner—

(*a*) to inform the patient that whereas he had only considered his fitness for his normal occupation he was satisfied on further consideration that he was fit for alternative occupations;

(*b*) to indicate concurrence with the R.M.O.'s report by issuing a final certificate with a note to the society giving the reasons which led him to modify his previous opinion; or

(*c*) he may issue an intermediate certificate, intimating his reason for differing from the R.M.O.'s opinion.

In these circumstances the society will frequently refer the case again, and the practitioner is given an opportunity of seeing the case in conjunction with the examining officer at a time fixed to suit the convenience of the practitioner.

Voluntary Contributors in the Post Office

The Postmaster-General has drawn the attention of the British Medical Association to the position of post-office employees entitled by reason of their employment to free medical attendance from the post office, and also qualified for medical benefit under the N.H.I. Acts by electing to become voluntary contributors. Apparently several employees had chosen the post-office doctor as their panel doctor, and this doctor was therefore being paid twice over for the same service. The P.M.G. suggested that this was an infringement of the terms of service on the part of the insurance practitioners concerned, as they had contracted to refrain from accepting remuneration from sources other than insurance funds in respect of duties devolving upon them under the N.H.I. Acts. He thought that in these cases the post-office capitation fee should be scaled down so as to exclude duties covered by insurance, 2*s*. 6*d*. per head being allowed to cover the advisory and administrative duties which these medical officers would still be called upon to perform. The B.M.A., after consulting counsel, replied that whilst it did not countenance dual payment it strongly challenged the contention that there was any infringement of the terms of service. The P.M.G. then said that whatever the legal position the services rendered under the Act and under the post-office medical service were largely identical, and he suggested a settlement by the end of the year on the lines indicated above. This was agreed to in cases where the post-office doctor and the insurance doctor are the same person. If the voluntary contributor transfers to another insurance practitioner the 2*s*. 6*d*. fee reverts to 11*s*. for the post-office doctor. The private practitioner, who is post-office doctor and not on the list of any insurance committee, is not affected by these proposals.

Brandy as a Medicine

"Doctors may prescribe brandy as a medicine for their panel patients" is reported to be the decision of the Ministry of Health. This settles a dispute that arose in Bath, where an insurance practitioner prescribed "brandy" on a National Health Insurance form, and the prescription was challenged. Apparently the view of the Ministry is that whilst brandy can be used for other purposes that does not prevent its being used as a medicine. Practitioners would, no doubt, be well advised to be cautious in exercising this liberty, as they will have to be prepared to justify its prescribing in the case of inquiry.

The Insurance Acts Committee have approved of the Ministry's proposal that insurance committees should inform insured persons accepting transfer to the successor of a practice, nominated under Clause 4 (1) of the terms of service, that they need not have their cards signed by the successor, the signature of the predecessor being regarded as sufficient.

The new issue of the British Pharmacopœia necessitates a revision of the National Formulary, and suggestions are invited from all panel committees for the improvement of this revised edition. A special committee is working on it, and it is expected to be ready about the middle of 1933.

PAPWORTH VILLAGE SETTLEMENT.—A "dower house" for nurses was opened recently. It has been erected by ex-patients, now employed by Papworth Industries, at a cost of £1750.

OBITUARY

FLORENCE ADA STONEY, O.B.E., M.D. Lond., D.M.R.E.

Dr. Florence Stoney, who died on Oct. 8th after a long and painful illness, was one of the band of medical women who in August, 1914, within a fortnight of the outbreak of war, had already formed themselves into a corps equipped for foreign service, and actually started for Brussels on August 18th. The advance part of the corps, which was organised by Mrs. St. Clair Stobart, were taken prisoners; the main part escaped, and with its medical staff, reorganised to release most of the senior women surgeons for other work, set out this time for Antwerp. The quiet skill with which, under Dr. Stoney's direction, a music hall was converted into a surgical hospital in less than five days won especial praise from the British Consul-General; and though this hospital had to be evacuated in less than a month from its establishment, after being under shell-fire for 18 hours, it filled a need at a time when the British war hospitals had not yet reached Antwerp, for British and Belgian wounded could be taken there straight from the front line. It was this successful enterprise which showed the potentialities of hospitals staffed by medical women, and encouraged Dr. Elsie Inglis later to found the Scottish women's hospitals.

DR. FLORENCE STONEY

[*Photograph by J. Russell & Sons*

Dr. Stoney was born in 1870, being the second daughter of G. Johnstone Stoney, Sc.D., F.R.S., secretary to the Queen's University of Belfast. She received her medical education at the London (R.F.H.) School of Medicine for Women, where she was a distinguished student. She qualified M.B., B.S. Lond. in 1896, and became M.D. in 1898. After holding an appointment as house surgeon at the Victoria Children's Hospital, Hull, Dr. Stoney turned her attention to the then new specialty of radiology, and organised and developed the X ray departments at the Royal Free and at the Elizabeth Garrett Anderson Hospitals, while acting also as demonstrator in anatomy at the London School of Medicine. This work, combined at first with general practice, and later with private practice as a radiologist, engaged her energies until the war, when it was her desire to put her experience of a specialised branch of medical knowledge at the disposal of the nation, rather than a zest for excitement, that led to her pioneer activities. These did not cease with the evacuation of the Antwerp Hospital. In November, 1914, the corps was abroad again, at the request of the French Croix Rouge, installed in the Chateau Tourlaville, near Cherbourg. It was not suited for a hospital, and Florence Stoney and her colleagues had to arrange for sanitation, water, heating, and even to generate their own electric power. The hospital was soon ready to receive cases; slighter cases were sent on south, and only those very badly wounded were retained. By March, 1915, this stream of wounded had been diverted, and Dr. Stoney felt able to accept the post of radiologist to the Fulham Military Hospital (being for some time the only woman on the staff), where over 15,000 patients went through her department, other hospitals sending in cases for X ray localisation of bullets. Dr. Stoney received the 1914 star, and on demobilisation the O.B.E.

After the war she was unable, on grounds of health, to resume work in London. In 1920 she took the D.M.R.E. at Cambridge and settled in Bournemouth in radiological practice, being appointed consulting medical officer to the electrical department of the Royal Victoria and West Hants Hospital, Bournemouth, and consulting actinotherapist to the Victoria Cripples' Home. She retired in 1928 and travelled in India, studying especially osteomalacia and its treatment by ultra-violet radiation, on which she published observations.

Dr. Stoney's charming whimsical manner made it difficult to perceive at first the strength of her personality. She did not seek adventure, but only the opportunity of quiet service. Her organising skill and tact undoubtedly opened the door through which many medical women subsequently passed without fuss or hindrance to give war service which was recognised as being of the utmost value. It is not generally known that the portable X ray equipment, in those days a rare possession, with which she offered her services in vain to the War Office on August 4th, 1914, was assembled by her and her sister, Edith, as the outcome of Lord Roberts's suggestion that medical women might be of especial use in the event of an outbreak in Ireland. The urge to be equipped for service was a characteristic of Florence Stoney, and enabled her to do well any work which came to her hand.

THE LATE PROF. STIRLING

Dr. REGINALD LAWRENCE (County Hall, Wakefield) writes: "To your obituary notice of Prof. Wm. Stirling I should like to add a personal impression of his lectures which remains vivid after the passage of many years. His tall figure was commanding, and his mannerisms of bearing and dress accentuated the effect. The relation between him and his students was intimate, and his utterance was followed attentively, because without any change in his impassive face he would, with some surprising remark, convulse the class with laughter and as readily check it if it tended to become too boisterous or prolonged. I never knew anyone take liberties with him.

"A more lasting impression, however, is the sloping ledge in front of his lecture table on which were displayed, open at the correct page, the original authorities for the current lecture. He personally stimulated me to learn German, and the occasional loan of the papers and monographs, set out daily, served to keep up the stimulus. But even that was not so powerful as the revelation of his knowledge of physiologists and their milieu which enabled him to write his 'Apostles of Physiology' later. His reference to his 'revered master Karl Ludwig' was

always cheered (as a great joke), but the mention of other names, accompanied by contemporary details, was of more than passing interest. Harvey and Malpighi brought with them a short account of the universities of the middle ages, Padua and Bologna respectively; Ranvier as a zoologist showing his genius in the selection of his material to demonstrate histological structures; Claude Bernard working in comparative neglect in a cellar at the Collège de France led on naturally to the University of Paris; and, again, Stannius 'in far-off Rostock' whose ligature of the heart enabled heart muscle to be studied apart from nerve tissue, and described his discovery in a pamphlet of about two pages (O si sic omnes!); Haller, Majendie, Stephen Hales—the neighbour of Gilbert White; and, outside physiology, significantly enough Casanova and Voltaire who visited England. These are only a miscellaneous few which come to mind, and there were many others. The allusions were not mere decorative details but part of the texture of his lectures, which he thus raised to the level of cultural importance."

MEDICAL NEWS

University of London

At recent examinations the following candidates were successful:—

D.P.H.

L. P. Clarke, Dorothy Makepeace, T. L. Narayana, and Doris G. Sharvelle.

University of Liverpool

At recent examinations the following candidates were successful:—

D.P.H.

L. G. Anderson, *F. J. H. Crawford, C. L. Emmerson, H. P. Fowler, and G. A. Fulton.

* With distinction.

University of Bristol

The Long Fox memorial lecture will be given at 5.30 P.M. on Tuesday, Oct. 25th, by Mr. A. J. M. Wright, surgeon to the nose and throat department of Bristol General Hospital. His subject will be the Problem of Deafness, and the vice-chancellor of the University will preside.

Medico-Legal Society

At a meeting of this society, to be held at 11, Chandos-street, London, W., at 8.30 P.M. on Thursday, Oct. 27th, Sir John Collie will open a discussion on Fraud in Medico-Legal Practice.

Hampstead and North-West London Hospital

On Wednesday, Oct. 26th, at 3 P.M., Sir Ernest Graham-Little will open a post-graduate course at this hospital with an address on Voluntary Hospitals and their Future. Subsequent lectures will be given on Wednesdays at 4 P.M.

South-West London Post-Graduate Association

A series of lecture-demonstrations will be held at St. James's Hospital, Ouseley-road, Balham, on Wednesdays at 4 P.M. from Oct. 26th. At the first Dr. H. J. Churchill will speak on Anæsthetics in General Practice. Particulars of membership may be had from the hon. secretary, Dr. R. J. Saunders, 10, Lyford-road, Wandsworth Common, S.W. 18.

West Kent Medico-Chirurgical Society

The annual general meeting of this society will be held to-day, Friday, Oct. 14th, at the Miller General Hospital, Greenwich, at 8.45 P.M., when cases will be shown. At the second meeting of the session, on Nov. 11th, Dr. Donald Paterson will speak on Some Advances in Pædiatrics.

London Association of the Medical Women's Federation

The programme for the autumn session opens on Oct. 25th, when a presidential address will be delivered by Prof. Mary Lucas-Keene, entitled Anatomy, Now and Then. On Nov. 22nd Miss M. M. Chadburn, M.D., will read a paper on Mistakes, and on Dec. 15th Mr. A. S. B. Voge, Ph.D., will speak on Recent Research in Contraception. These meetings will be held at 8.30 P.M. at B.M.A. House, Tavistock-square.

British Institute of Radiology

The first meeting of the session will be held in the Reid-Knox memorial hall of this institute, 32, Welbeck-street, London, W., at 8 P.M. on Thursday, Oct. 20th. After the business part of the meeting is over a paper by Prof. Sidney Russ, D.Sc., and Miss G. M. Scott, on the Differential Action of Gamma Rays, will be read. On Friday, at 11 A.M., members are invited to visit the radiological department of the City of London Hospital for Diseases of the Heart and Lungs, Victoria Park. At 5 P.M. there will be a lantern demonstration on Radiology in Obstetrics by Dr. R. E. Roberts, and Dr. Ulysses Williams will give a brief clinical history of pathological changes recorded in a patient with radium needle in the heart for three years.

Appointments to the Cancer Hospital

It has been decided to increase the medical and surgical staff of the Cancer Hospital (Free), Fulham-road, London, and in our advertisement columns applications are invited for the honorary posts of neurologist, dermatologist, gynæcologist, and ophthalmic surgeon.

Child-Study Society, London

The first meeting of this session will be held at the Royal Sanitary Institute, 90, Buckingham Palace-road, S.W., at 6 P.M. on Thursday, Oct. 20th. Mr. P. B. Ballard, D.Litt., will deliver the Cockburn memorial lecture on Thirty Years' Progress in London Education. At the second meeting on Nov. 12th, Miss Anne Adler, J.P., will speak on Children's Courts.

St. Paul's Hospital

A post-graduate course in genito-urinary diseases is being held at St. Paul's Hospital, Endell-street, Shaftesbury-avenue, London, W.C., at 4.30 P.M. on Wednesdays until Nov. 30th. This course is free to medical practitioners and students.

National Hospital, Queen-square

Post-graduate courses are now in progress at this hospital. They include out-patients' clinics daily (except Saturdays) at 2 P.M., lectures and clinical demonstrations on the same days at 3.30 P.M., pathological demonstrations on Wednesdays and Fridays at noon, anatomical demonstrations on Thursdays at noon, and demonstrations of methods of clinical examination on Tuesdays and Thursdays at 5 P.M. Further particulars may be had from the dean of the medical school, National Hospital, Queen-square, London, W.C. 1.

Royal Institute of Public Health

A course of lecture-discussions on Mental Defectiveness as a Medico-Sociological Problem will be given at this institute, 23, Queen-square, London, W.C., at 4 P.M. on Thursdays from Oct. 27th. The opening lecture will be by Prof. R. J. A. Berry, chairman of the mental deficiency committee of the British Medical Association, and the other speakers will be Dr. R. M. Stewart, Dr. R. G. Gordon, Dr. C. P. Blacker, Dr. Letitia Fairfield, and Dr. Doris Odlum. There will also be a course in preventive medicine at 4 P.M. on Wednesdays from Oct. 19th. It will be opened by Sir Ernest Graham-Little, with an address on Preventive Medicine and Education of Public Opinion. Other lecturers will be Dr. D. Chalmers Watson, Mr. Malcolm Donaldson, Dr. H. Crichton-Miller, Prof. W. H. Maxwell Telling, Miss M. F. Forrester-Brown, Dr. C. P. Blacker, and Sir Pendrill Varrier-Jones.

Fellowship of Medicine and Post-Graduate Medical Association

A series of lectures on Renal Disease will take place at the Medical Society of London, at 4 P.M. on Tuesdays. The first lecture will be given by Dr. E. C. Warner, on Oct. 18th, on Medical Aspects of Hæmaturia. These lectures are free to members of the Fellowship. A fortnight's course in general medicine and surgery will take place at the Miller General Hospital, Greenwich, from Oct. 17th to 29th, occupying the whole of each day. There will be a morning course in diseases of children at the Hospital for Sick Children, Great Ormond-street, from Oct. 24th to Nov. 5th, and a course in neurology, at 5 P.M. daily, from Oct. 31st to Nov. 26th, at the West End Hospital for Nervous Diseases. From Oct. 21st to Nov. 19th an afternoon course in ophthalmology will be given at the Royal Westminster Ophthalmic Hospital. A weekly course in Uterine Infections in Obstetrics and Gynæcology is given at the St. Mary Abbots Hospital. A course in practical pathology is being arranged at the Hospital for Consumption, Brompton. Further details of these courses may be had from the secretary of the Fellowship, at 1, Wimpole-street, London, W. 1.

A Medical Cruise

The weekly review of medicine, *Bruxelles-Médical*, announces the organisation of a medical cruise for Easter, 1933. The itinerary, which commences at Marseilles on April 8th, closes at the same port on May 1st, and will include visits to Greece, Corfu, Venice, Sicily, and the Adriatic coast and the port of Rome. The accommodation is reserved for medical practitioners or persons recommended by them, and for practitioners' families, and the inclusive charge per head has been fixed at 3975 francs first class and 2100 francs second class. The steamer chartered has 190 first-class berths and 60 berths for students. Those wishing to join the tour should apply to the travel section of the Bruxelles-Médical, 29, Boulevard Adolphe Max, Brussels, when further information will be supplied.

King's College Hospital Dinner

The annual dinner of past and present members of the school was held on Oct. 1st at the Connaught Rooms. Dr. Godfrey de Bec Turtle presided. The guests of the evening were Mr. A. D. Power, vice-chairman of the committee of management of King's College Hospital, and Dr. A. D. Cowburn, coroner for South London. The chairman, in proposing the toast of the medical school and the hospital, after paying a tribute to Sir Watson Cheyne as a most distinguished member of the hospital who had died during the year, spoke of recent criticisms of the medical curriculum. Since medicine was a progressive science there could be no finality about the curriculum, but he held that the end-product obtained—i.e., the newly qualified man or woman—showed that there was nothing radically wrong with the curriculum. Doctors in this country were very fortunate, for there was practically no unemployment in the profession. After welcoming the guests, Dr. Turtle, on behalf of 315 subscribers, presented to Dr. Willoughby Lyle a piece of hand-wrought plate in commemoration of services extending over more than 20 years as dean of the medical school. In thanking the donors, Dr. Willoughby Lyle gave reminiscences of many King's College Hospital men, notably Sir William Ferguson, Dr. Bentley Todd, Sir William Bowman, Lord Lister, Prof. Albert Carless, and Dr. Raymond Crawfurd, and gave special praise to the vice-deans who had worked under him—Dr. Harold Wiltshire, Dr. J. A. Drake, and Dr. H. A. Lucas. Dr. Drake, the new dean, gave a short account of the work of the medical school during the past year, the outstanding event of which was the beginning of the new buildings, which will include a new pathological museum, research department, lecture hall, and common rooms. Three members of the school had been awarded travelling fellowships, and once again a member of the school had also obtained the Murchison scholarship for clinical medicine.

Royal Dental Hospital

At the prize distribution of this hospital on Oct. 3rd, Mr. Harry Stobie, the dean, said that an important change had been made by the Royal College of Surgeons in the regulations governing the licence in dental surgery. Greater emphasis was to be laid on medicine, pathology, and bacteriology, in which there would in future be an examination. He reminded his audience that the new orthodontic department, under the directorship of Sir Norman Bennett, was to be inaugurated that night, and that it was hoped soon to create a special department for the treatment of diseases of the gums. The dean expressed his regret at the resignation of Mr. J. G. Turner, who had joined the staff in 1895, but said that his talents would still be available to the hospital as director of research. Mr. L. E. Claremont had been appointed hon. assistant dental surgeon, and Mr. C. Bowdler Henry and Mr. N. J. Ainsworth honorary dental surgeons. The dean in conclusion referred to the decision to discontinue the admission of women to the school. "It has been decided," he said, "that after March, 1933, no more women are to be admitted as students. Their absence will seem strange, for they have furnished a hard-working and painstaking body of students, and provided the hospital with some of its very best house officers." He also announced that the late Mr. R. Stanway Parris had left a legacy to found a prize to be awarded every year to the student showing the greatest inventive genius.

Lord Riddell, after opening the new orthodontic department and distributing the prizes, gave a short address on How to Teach the Public about their Teeth. He emphasised the necessity of enlisting the aid of the press in arousing interest, but maintained that no serious propaganda effort could succeed unless directed by the expert knowledge of the dentists themselves. At present no provision was made for the dental inspection and treatment of children under 5 and between the ages of 14 and 18. In 1930, of the 2,000,000 school-children who were referred for treatment, only about 1,250,000 actually were treated, and to achieve even this total each dentist had to deal with about 4000 children. To provide a complete school dental service, instead of the present 521 dentists, 2000 whole-time workers would have to be employed. These figures showed that there was little time for preventive work. Under the National Health Insurance scheme some £2,000,000 was at the disposal of the approved societies for dental treatment, but when the number of people to be treated was considered this was not so much as it sounds. Although dental treatment was offered at most antenatal clinics few expectant mothers realised the necessity for availing themselves of it. Lord Riddell said he thought that to remedy these conditions the dentists should form local organisations and strive to create a "tooth sense" among the public, for only then would public opinion demand greater facilities for dental treatment for everybody.

St. Thomas's Hospital Dinner

At Dorchester House, on Oct. 7th, Major-General Sir Guise Guise-Moores said that he was the first Regular Army officer to preside over the St. Thomas's annual dinner. His handling of the situation suggested that the experiment should be frequently repeated, while his anecdotes about the Secretary of State for the Dominions drew out all that was best in subsequent speakers. On turning to more serious subjects, Sir Arthur Stanley, treasurer of the hospital, said that investments worth nearly £50,000 had now been collected towards establishing a really good out-patient department, and that the cost of beer used in the hospital had risen from £30 in 1928 to something like £300 this year. Some of the staff seemed to be prescribing beer instead of drugs, and if this went on St. Thomas's was likely to become increasingly popular. In former days, however, beer had taken an even more prominent place; and here Sir Arthur produced some helpful facts from the first volume of Prof. F. G. Parsons's new "History of St. Thomas's Hospital." In 1584, it appears, the daily allowance of a pottle (four pints) to the hospitaller was raised to a gallon, and so far as he knew this ruling had never been rescinded; though if it were claimed to-day the amount would again be reduced to a pottle, he thought, in the interests of economy. In those days every patient had two pints of beer a day, or three pints in hot weather; and he had calculated that this arrangement would nowadays cost the hospital £12,000 a year. Prof. Parsons's history, continued Sir Arthur, proves that we are much older than Bart.'s. At the time when Rahere came into existence St. Thomas's was being rebuilt after a fire. It was then refounded by Edward VI., with, among others, two sisters to wash the clothes of the poor when necessary and when convenient ("I should think it was always necessary and never convenient") and one expert surgeon to *cure* their diseases ("not what all of you do"). One sober and pious man was also appointed to manage the funds, and Sir Arthur Stanley was delighted to feel that he himself was in the direct succession.

Dr. H. Gardiner-Hill, the sub-dean, reported for the medical school in the absence of Prof. L. S. Dudgeon through illness. After referring to the losses sustained by the retirement of Prof. Hugh MacLean, Mr. H. J. Marriage, and Dr. S. E. Dore, he spoke of the new appointment of Prof. O. L. V. de Wesselow as director of the medical unit, and of Dr. J. St. C. Elkington as assistant physician. Mr. D. F. A. Neilson and Mr. W. A. Mill had been appointed assistant surgeons in the ear, nose, and throat department, and Dr. G. B. Dowling physician in charge of the skin department. Of its old students the hospital had lost, by death, Dr. W. F. Haslam, Mr. Harold Low, Sir Robert Fox-Symons, Mr. J. F. Cunningham, and Dr. E. C. Freeman. During the year Sir Farquhar Buzzard had become physician-in-ordinary, Dr. Maurice Cassidy physician-extraordinary, and Mr. P. H. Mitchiner honorary surgeon, to the King. Sir Percy Sargent had been elected vice-president of the Royal College of Surgeons; Sir Charles Ballance had been awarded the Lister medal of the College; and among the students, Mr. T. A. Lloyd Davies had gained the gold medal in the London M.B. examinations. St. Thomas's had won the inter-hospital boxing for the sixth time in seven years; the sports shield for the third year; all three events of the inter-hospital rowing; and the lawn tennis and golf competitions.

Dr. Gardiner-Hill then proposed the health of the chairman, and he briefly replied.

Charles Mickle Fellowship

The Charles Mickle Fellowship for 1932 has been awarded to Dr. Gaston Leon Ramon, director of the Pasteur Institute Farm at Garches, France, for his work on diphtheria toxin and anatoxin. The fellowship, which is awarded by the council of the Faculty of Medicine of the University of Toronto to the member of the medical profession who in the preceding ten years has done most to advance practical medical knowledge, is the annual income from a legacy of 25,000 dollars left by the late Dr. W. J. Mickle.

University College, Cork

At recent examinations Dr. Denis Hegarty was approved for the diploma in psychological medicine.

Sun Pavilion at Rugby

On Saturday last the Princess Royal opened a new sun pavilion at the hospital of St. Cross, Rugby.

"Alexandra Day" London Collection

It is officially stated that the collections on "Alexandra Day" in London, on June 8th last, amounted to £48,268. To this had to be added collections by steamship companies of £570, and other income, £3566, making a total of £52,404. The expenses amounted to £8327. Of the balance, £5045 was given to charities in which Princess Victoria is especially interested, and £39,461 was distributed to various hospitals and charities.

Elsie Inglis Hospital, Belgrade

The municipality of Belgrade has taken over the Dr. Elsie Inglis Memorial Hospital at Dadinje, near Belgrade, and will run it for ten years. The municipality has also taken over all the debts of the hospital, which was closed down last July. Of the total debts, which are said to amount to approximately £160,000, the municipality is paying £80,000 immediately. The hospital will at once be reopened with 200 beds. It will retain the title of the Elsie Inglis Memorial Hospital, and will still remain nominally the property of the Belgrade Society of Women Doctors, reverting to them at the end of ten years, subject to the repayment of the debts paid by the municipality.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

The following appointments are notified: Surg.-Comdr. L. F. Strugnell to *Vivid*, for R.M. Infirmary, Plymouth.

Surg. Lts. A. Lawrence-Smith to *Pembroke*, for R.M. Infirmary, Chatham; R. Russell to *Codrington*, and A. H. O'Malley to *Vivid*, for R.N.B., Devonport, and for Devonport Dockyard.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt. R. L. Stubbs is promoted to Surg. Lt.-Comdr.

ROYAL ARMY MEDICAL CORPS

Maj. F. Worthington to be Lt.-Col.

Maj. J. B. Fotheringham to be Dep. Surg., R. Hosp., Chelsea.

Maj. F. M. Lipscomb, Dep. Surg., R. Hosp., Chelsea, relinquishes his appt.

Capt. G. R. Dobrashian relinquishes his temp. commn.

ARMY RESERVE OF OFFICERS

Lt.-Col. S. E. Lewis, having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers.

TERRITORIAL ARMY

Maj. W. George to be Lt.-Col.

J. V. Bradley (late Cadet Corpl., King Edward's Sch. (Birmingham) Contgt., Jun. Div., O.T.C.) to be Lt.

Supernumerary for Service with the O.T.C.—Lt. A. J. Parer resigns his commn.

INDIAN MEDICAL SERVICE

Lt. (on prob.) J. R. Dogra to be Capt. (prov.) (on prob.)

COLONIAL MEDICAL SERVICE

Dr. E. Cochrane has been appointed Assistant Medical Officer of Health, British Guiana, and Dr. C. Ramdeholl, Medical Officer, British Guiana.

Dr. D. B. D'Alivis, Medical Officer, Grade 1, has been promoted to Inspecting Medical Officer, Ceylon.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED OCT. 1ST, 1932

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 23 (last week 6); scarlet fever, 1792; diphtheria, 840; enteric fever, 68; acute pneumonia (primary or influenzal), 558; puerperal fever, 26; puerperal pyrexia, 71; cerebro-spinal fever, 29; acute poliomyelitis, 32; acute polio-encephalitis, 2; encephalitis lethargica, 12; continued fever, 1 (Doncaster R.D.); dysentery, 9; ophthalmia neonatorum, 74. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Oct. 4th–5th was as follows:—Small-pox, 42 under treatment, 1 under observation (last week 27 and 2 respectively); scarlet fever, 1472; diphtheria, 1505; enteric fever, 20; measles, 242; whooping-cough, 346; puerperal fever, 24 (plus 8 babies); encephalitis lethargica, 229; poliomyelitis, 6; "other diseases," 160. At St. Margaret's Hospital there were 19 babies (plus 10 mothers) with ophthalmia neonatorum.

Fifteen of the 23 new cases of small-pox were reported from the county of London—namely, Bethnal Green, 3; Hackney, 1; Islington, 3; Poplar, 8.

Deaths.—In 117 great towns, including London, there was no death from small-pox, 3 (1) from enteric fever, 5 (1) from measles, 1 (0) from scarlet fever, 16 (5) from whooping-cough, 22 (7) from diphtheria, 76 (20) from diarrhœa and enteritis under two years, and 27 (5) from influenza. The figures in parentheses are those for London itself.

The deaths from diarrhœa were maintained, the highest figures being: Liverpool, 9; Birmingham, 7; Leeds, 5. Ealing and Tottenham each reported a death from enteric fever. Diphtheria accounted for 3 deaths each at Leeds and Liverpool, 2 at Manchester. Manchester reported 5 deaths from influenza.

The number of stillbirths notified during the week was 273 (corresponding to a rate of 43 per 1000 total births), including 30 in London.

Medical Diary

SOCIETIES

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.

TUESDAY, Oct. 18th.—4 P.M., Sir George Newman: Harveian Oration.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, Oct. 17th.—8.30 P.M., SURGERY: SUBSECTION OF PROCTOLOGY. Paper: Dr. R. C. Coffey (Portland Oregon, U.S.A.): Treatment of Cancer of the Rectum. Other speakers: Mr. J. P. Lockhart-Mummery and Mr. W. Ernest Miles.

TUESDAY.—5.30 P.M., GENERAL MEETING OF FELLOWS. 8.30 P.M., PATHOLOGY. Presidential address: Prof. A. Fleming: Lysozyme.

THURSDAY.—5 P.M., DERMATOLOGY. (Cases at 4 P.M.). Dr. R. Klaber: 1. Xanthomatosis with Hæmochromatosis (with micro-sections). Sir Aldo Castellani: 2. Tinea Imbricata (Tokelau) in a European. Other cases will be shown. 8.30 P.M., NEUROLOGY. Presidential address: Dr. J. S. Risien Russell: Forty Years in Neurology.

FRIDAY.—10 A.M., OTOLOGY. Reception and discussion of the Report of the Subcommittee for the consideration of Hearing Tests. 5.30 P.M., PHYSICAL MEDICINE. Presidential address: Sir Robert Stanton Woods. 8.15 P.M., OBSTETRICS AND GYNÆCOLOGY. Discussion: The Indications for and Against Cæsarean Section. Opener: Dame Louise McIlroy. Other speakers: Mr. L. Carnac Rivett, Dr. Everard Williams, and Dr. W. S. Richardson. Short communication: Mr. S. G. Luker: Exophthalmic Goitre in Pregnancy and Labour. 7 P.M., RADIOLOGY. Presidential address: Dr. Russell J. Reynolds: Radiology To-day.

EUGENICS SOCIETY.

TUESDAY, Oct. 18th.—5.30 P.M. (at the Rooms of the Linnean Society, Burlington House, Piccadilly, W.), Dame H. Gwynne-Vaughan, D.Sc.: The Contribution of Plants to the Study of Heredity.

HUNTERIAN SOCIETY.

MONDAY, Oct. 17th.—8.30 P.M. (at Simpson's Restaurant, Bird-in-Hand-court, 76, Cheapside, E.C.), Dr. Nathan Raw: Human and Bovine Tuberculosis. (Presidential address, preceded by dinner at 7.15.)

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Upper Montague-street, W.C.1.

FRIDAY, Oct. 21st.—5 P.M., Dr. G. H. Pearce: The Yorkshire Branch and the Society. (Presidential address.)

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Oct. 17th, to SATURDAY, Oct. 22nd.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. Tues., Series of Lectures on Renal Diseases. Dr. E. C. Warner: Medical Aspects of Hæmaturia. (Free to Members.)—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Course in Gynæcology.—MILLER HOSPITAL, Greenwich, S.E. Course in general medicine and surgery. All day, demonstrations, operations,

and lectures. Specially suitable for general practitioners.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Clinical instruction daily at 2 and 6 P.M. Lectures on Tues. and Thurs. at 5 P.M.—CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road. All day course in Diseases of the Ear, Nose, and Throat.—LONDON LIGHT CLINIC, Ranelagh-road, S.W. Lecture demonstrations on Physical Medicine. Mon. and Wed., 8–9 P.M.—The above courses are open only to Members.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Oct. 18th.—5 P.M., Dr. H. T. Barron: Purpura.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, Oct. 19th.—4.30 P.M., Dr. G. R. Mather Cordiner: Radiological Investigation of Urinary Disease.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY, Oct. 17th.—2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Denny-Brown: Spinal Reflexes.
TUESDAY.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Denny-Brown: Spinal Reflexes.
WEDNESDAY.—2 P.M., Dr. Martin: Out-patient Clinic. 3.30 P.M., Dr. Collier: Clinical Demonstration.
THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Gordon Holmes: Cranial Nerves and Special Senses.
FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. Bernard Hart: Psychoneuroses.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark-hill, S.E.
THURSDAY, Oct. 20th.—9 P.M., Mr. C. P. G. Wakeley: Head Injuries.

BRITISH INSTITUTE OF RADIOLOGY.
THURSDAY, Oct. 20th.—8 P.M., Prof. Sidney Russ and Miss G. M. Scott: The Differential Action of Gamma Rays.
FRIDAY.—11 A.M., Visit to the radiological department of the City of London Hospital, Victoria Park, E. 5 P.M. (1) Dr. R. E. Roberts: Radiology in Obstetrics; (2) Dr. Ulysses Williams: Radium Needle in the Heart for Three Years.

ROYAL INSTITUTE OF PUBLIC HEALTH, Queen-square, W.C.
WEDNESDAY, Oct. 19th.—4 P.M., Sir Ernest Graham-Little: Preventive Medicine and the Education of Public Opinion.

NATIONAL COUNCIL FOR MENTAL HYGIENE.
WEDNESDAY, Oct. 19th.—5.30 P.M. (at 11, Chandos-street, W.), Dr. Mary R. Barkas: Guilt.

CHADWICK PUBLIC LECTURES.
THURSDAY, Oct. 20th.—5.15 P.M. (in the Theatre of the Royal United Services Institution, Whitehall). Sir Humphry Rolleston: The Pioneers and Progress of Preventive Medicine.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, Oct. 18th.—4.15 P.M., Prof. E. D. Telford: Osteitis Deformans.
FRIDAY.—4.15 P.M., Dr. A. H. Holmes: Demonstration of Medical Cases.

MANCHESTER HOSPITAL FOR CONSUMPTION AND DISEASES OF THE THROAT AND CHEST, Hardman-street, Deansgate.
WEDNESDAY, Oct. 19th.—4.30 P.M., Dr. Vernon Smith: Nasal Polypi.

ANCOATS HOSPITAL, Manchester.
THURSDAY, Oct. 20th.—4.15 P.M., Dr. W. J. S. Reid: Anæmias of Chlorotic Type.

Appointments

ORMEROD, G. L., M.B., Ch.B. Bristol, has been appointed Medical Officer to the Post Office, Westbury-on-Trym.

Vacancies

For further information refer to the advertisement columns.

Bangor, Carnarvonshire and Anglesey Infirmary.—Jun. H.S. £100.

***Barry Urban District Council Surgical Hospital.*—H.S. At rate of £200.**

Bethlem Royal Hospital, Monk's Orchard, Beckenham, Kent.—Consulting Ophthalmologist.

Bradford Royal Infirmary.—H.P. and H.S. Each at rate of £135.

Beckenham, Bethlem Hospital, Monk's Orchard, Eden Park.—Res. H.P. At rate of £150.

Cancer Hospital, Fulham-road, S.W.—Hon. Neurologist, Hon. Dermatologist, Hon. Gynæcologist. Hon. Ophthalmic Surgeon.

***Cheltenham General and Eye Hospitals.*—Hon. Surgeon for Ear, Throat, and Nose Diseases.**

Chester Royal Infirmary.—H.S. £150.

***Eastbourne, Princess Alice Memorial Hospital.*—H.S. At rate of £150.**

Fareham, Hants, Knowle Mental Hospital.—Third Asst. M.O. £350.

***Gloucester County and City Mental Hospital.*—Jun. Asst. M.O. £350.**

***Gloucester, Gloucestershire Royal Infirmary, &c.*—Hon. Anæsthetist.**

Great Yarmouth General Hospital.—H.S. £140.

Hertford County Hospital.—Hon. Ophth. Surgeon.

Kidderminster and District General Hospital.—H.S. £150.

***Lancaster Royal Infirmary.*—Jun. H.S. At rate of £130.**

***Liverpool, County Mental Hospital, Rainhill.*—Asst. M.O. £500.**

Liverpool Hahnemann Hospital, Hope-street.—Res. M.O. At rate of £100.

Liverpool Royal Babies Hospital.—Res. M.O. At rate of £90.

Liverpool University.—Junior Lecturer for Dept. of Pathology. £300.

London County Council.—Asst. M.O. £475.

***Manchester City Education Committee.*—Asst. School M.O. £600.**

***Manchester Royal Children's Hospital, Pendlebury.*—Res. Surg. O. At rate of £125.**

Middlesex County Council.—Asst. County M.O.H. £750.

***Minehead and West Somerset Hospital.*—Res. M.O. At rate of £150.**

***Nottingham, Harlow Wood Orthopædic Hospital.*—Asst. to the Surgeon in Charge. £450.**

Plymouth, South Devon and East Cornwall Hospital.—Res. Surg. O. and H.S. to Special Departments. At rate of £150 and £100 respectively.

Princess Louise Kensington Hospital for Children, St. Quintin-avenue, N. Kensington, W.—Hon. Asst. Surgeon to Nose, Throat and Ear Dept.

Putney Hospital, Putney Common, S.W.—Hon. Consultant Ophth. Surgeon and Oto-Laryngologist.

***Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.*—Obstetric Surgeon to Out-patients.**

Reading, Royal Berkshire Hospital.—Res. Anæsthetist. £150.

Rochester, St. Bartholomew's Hospital.—H.S. At rate of £175.

Royal Eye Hospital, St. George's-circus, Southwark, S.E.—Hon. Asst. Surg.

Royal Free Hospital and London (R.F.H.) School of Medicine for Women, W.C.—Sen. Assist. At rate of £250. Also Second and Third Asst. £500 and £270 respectively.

***Royal National Orthopædic Hospital, 234, Gt. Portland-street, W.* Two Registrars. Each £105.**

Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Cas. O. and H.P. £200 and £100 respectively.

St. Bartholomew's Hospital, London, E.C.—Asst. Phys.

St. Mary's Hospital, W.—Med. Supt. £400.

St. Mary's Hospital, Institute of Pathology and Research, Paddington.—Research Studentship at rate of £200.

St. Olave's Hospital, Lower-road, Rotherhithe, S.E.—H.P. At rate of £80.

Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. At rate of £100. Also Anæsthetist.

South Shields, Harton Hospital.—H.S. At rate of £150.

The Radium Institute, Ridinghouse-street, W.—H.S. At rate of £150.

Uxbridge, Hillingdon County Hospital.—Chief Asst. Radiographer. £225.

Victoria Hospital for Children, Tite-street, Chelsea, S.W.—Anæsthetist. Also Sen. Res. M.O. £200.

Whipps Cross Hospital, Whipps Cross-road, Leytonstone, E.—Med. Supt. £1100.

Willesden, Municipal Hospital, Brentfield-road, Neasden, N.W.—Res. M.O. £250.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Chesterfield (Derby); Clay Cross (Derby); and Wolverhampton (Staffs).

A vacancy is announced for a Medical Referee under the Workmen's Compensation Acts (Northern Ireland) for the County of Fermanagh. Further information may be obtained from the Secretary, Ministry of Labour, Stormont, Belfast. Applications must be forwarded not later than Oct. 22nd.

Births, Marriages, and Deaths

MARRIAGES

LACHLAN—MANSEL.—On Oct. 8th, at Holy Trinity, Brompton, Kenneth Harry Lachlan, M.B., of Brentwood, to Lola, only daughter of the late Charles Mansel, O.B.E., M.D., and of Mrs. Mansel, Whitelyons, Brentwood, Essex.

DEATHS

BROWN.—On Oct. 3rd, at Kennington Park-road, Thomas Brown, M.R.C.S., in his 80th year.

CARROLL.—On Oct. 5th, at Harrington-gardens, S.W., of pneumonia, Colonel Frederick Fitzgerald Carroll, D.S.O., R.A.M.C., late of Egyptian Army and late of Moone Abbey Co. Kildare.

O'CONNOR.—On Oct. 7th, at Southsea, after a long and trying illness, Bernard O'Connor, M.D., D.P.H., M.R.C.P. Lond., and Barrister-at-Law, in his 84th year.

STONEY.—On Oct. 7th, Florence Ada Stoney, O.B.E., M.D., B.S. Lond., D.M.R.E. Camb., in her 63rd year.

THORNE.—On Oct. 6th, at The Mynde, Caerleon (Mon.), Atwood Thorne, F.S.A., M.B. Lond., aged 65.

THORNE.—On Oct. 4th, John Mills Thorne, M.R.C.S., L.R.C.P., of Brockham Green, Surrey, aged 70.

TOSSWILL.—On Oct 3rd, at Queen Mary's Hospital, Roehampton, Major Leonard Robert Tosswill, O.B.E. Mil., M.R.C.S., L.R.C.P., D.P.H., of Mistletoe Farm, Cuckoo-hill, Eastcote, aged 52 years.

N.B.*—*A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

DIABETES IN SCANDINAVIA

SICKNESS insurance on the one hand and insulin on the other, have profoundly changed the administrative problems of diabetes since the beginning of this century. A third factor, which some think contributes greatly to the seriousness of diabetes as a cause of disablement and death, is the big jump in the consumption of sugar per head in many civilised countries in our own times. The interplay of these and other factors as they affect the four Scandinavian countries, Denmark, Norway, Sweden, and Finland, is discussed in as many papers by their respective nationals, in *Nordisk Medicinsk Tidskrift* for Sept. 3rd. In Finland, it is stated, the consumption of sugar per head rose from 15·9 kg. in 1913, to 27·4 kg. in 1929. (In this year the consumption of sugar per head in the United States of America is said to have been 50·3 kg.) In 1890 only 10 diabetics received treatment in the hospitals of Copenhagen; at the present time there are between 5000 and 6000 diabetics in Denmark, and the central organisation for sickness insurance has an elaborate machinery for dealing with the insured diabetic worker. This organisation puts the services of its specialists at the disposal of general practitioners and does much else so that each case may enjoy the benefits of up-to-date knowledge adapted to individual needs. Before the introduction of insulin 89 per cent. of the insured diabetics applying for sickness benefit were treated as permanent invalids with a working capacity below a third of the normal. Thanks to the administrative machinery now at work, and the benefits of insulin which it is able to provide, only 38 per cent. of the persons applying for sickness benefit in 1930 had to be classed as permanent invalids.

The problem of the diabetic child in Norway is dealt with by Dr. Kirsten Toverud, who points out that insulin has produced an entirely new problem as far as the diabetic child is concerned. Formerly he just died, after an illness whose average duration was only 2·6 years according to Joslin. Now, with every year, there is a new crop of diabetic children capable of reaching healthy adult life if properly cared for. Even in such a small country as Norway the ranks of the diabetic child are being recruited by between 200 and 300 newcomers every nine years. Hitherto they have fared badly, about half of them dying for want of systematic supervision. Hence Dr. Toverud's advocacy of a combined diabetic home and dispensary where in-patient treatment can be supplemented by educational facilities so that the first period of hospital treatment does not entail too great a break in the child's life. Such a home, staffed by a specialist and a nurse, should also serve as a dispensary to which the child could come for periodic supervision.

The extent to which the diabetic problem in Sweden has grown from the administrative point of view, is shown by Dr. G. Kahlmeter, who states that while in 1918 only 30 insured persons received sickness benefit for diabetes, their number had risen to 246 in 1928. As for Finland, a paper by Dr. Holsti, shows that in Helsingfors the diabetes mortality for 1926–30 was higher than for any other quinquennium in the last twenty years. Yet it was only during these last five years that insulin had been extensively employed.

A NEW HEARING AID

IT is well known that the hearing of a deaf person may not be equally diminished through the entire range of audible frequencies; the subject of chronic middle-ear deafness, and especially of otosclerosis, is usually particularly deaf to the lower notes of the scale, while hearing high tones relatively well, whereas the sufferer from nerve-deafness fails to hear sounds of high frequency, such as the squeak of a bat or the song of birds. In a smaller number of cases, the hearing for different frequencies is much more irregular, and islands of hearing, or of deafness, may be found in various parts of the scale. With the ordinary micro-telephone type of electrical hearing aid, it is possible to amplify more especially the upper or the lower end of the scale, and this is sometimes done; but the instruments usually sold with a more or less "straight line" amplification have the defect that they magnify tones to which such a patient is not deaf, and may thus cause discomfort and even pain. If, however, the construction used in wireless receivers is followed, and valve amplification employed, it is possible to introduce filter circuits to give any characteristic desired. One difficulty in the practical use of such an apparatus has been that a current of at least 80 volts tension is necessary for the ordinary wireless valve, which involves the use of a prohibitively large and heavy battery; but the invention of the double-grid valve working at 25 volts has allowed an instrument to be put on the market of the size of a small box-camera, and weighing about four pounds. This has been produced by Messrs. Radio-Aid, Ltd., 4, Iddesleigh House, Caxton-street, London, S.W. 1, who are prepared to carry out the necessary tests before supplying the instrument, and who hope to develop an organisation by which patients living in the country, as well as those who live in London, can be tested. If such an instrument is carefully adapted to each individual patient after proper tests, it may prove to be of real service to those deaf people whose hearing varies much for different tones, and who are therefore unable to obtain help from the usual type of aid. Sufferers from senile deafness are not likely to obtain benefit from this instrument; and of others, only those whose deafness is severe are likely to avail themselves of it, for it is still a somewhat bulky piece of apparatus. The Radio-Aid Company have also designed a simplified form of audiometer, with which to make the necessary tests; it is named the audiograph, and is smaller and less expensive than the audiometers previously obtainable. Frequencies from 125 to 4000 cycles can be tested, and the volumes can be varied over 20 units of sound intensity. This instrument may commend itself to otologists for use in consulting rooms.

NEW PREPARATIONS

RADIOSTOL SOLUTION AND PELLETS.—These preparations of irradiated ergosterol, from the laboratories of British Drug Houses, Ltd., Graham-street, City-road, London, N., provide a pure crystalline vitamin D in two forms. The solution has a vitamin D activity such that one fluid ounce of the solution is equivalent in that respect to 2½ pints of cod-liver oil. The pellets contain the vitamin incorporated in cocoa butter, and one pellet is stated to have a vitamin content equivalent to that in an adult dose of cod-liver oil, and it is recommended that one should be eaten after a meal once or twice a day. The dose of the solution, prophylactic or therapeutic in intention, ranges from 5 drops daily to 10 drops three times daily.

(1) TAB. SODA RHEI CO.; (2) TAB. CEREVISLÆ CO. (Messrs. Barnold, Ltd., Milverton-street, Kennington, London). (1) This preparation in tablet form is a compound of bicarbonate of soda, carbonate of ammonia, rhubarb powder and peppermint oil, and the suggested dose is two or three tablets after meals. The assistance that would be rendered in certain forms of dyspepsia is obvious from the composition, and the tablets are a convenient form of administration. The advice that they should be given under medical direction is printed on the label. (2) This preparation is a compound of yeast and glycerophosphates, and attention has already been drawn to it in these columns (THE LANCET, Feb. 11th, 1928). Experimentation on mice and rats supports the manufacturers' opinion that in conditions of wasting or under-nourishment the tablets would be valuable, and they have received evidence suggesting that steady growth in the human subject has accompanied the use of the tablets.